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PLATE I. *Rome: the Castel S. Angelo*

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GEOGRAPHICAL HANDBOOK SERIES
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ITALY

VOLUME IV

DECEMBER 1945

NAVAL INTELLIGENCE DIVISION

*This volume was produced and
printed for official purposes
during the war 1939/45*

PREFACE

IN 1915 a Geographical Section was formed in the Naval Intelligence Division of the Admiralty to write Geographical Handbooks on various parts of the world. The purpose of these handbooks was to supply, by scientific research and skilled arrangement, material for the discussion of naval, military, and political problems, as distinct from the examination of the problems themselves. Many distinguished collaborators assisted in their production, and by the end of 1918 upwards of fifty volumes had been produced in Handbook and Manual form, as well as numerous short-term geographical reports. The demand for these books increased rapidly with each new issue, and they acquired a high reputation for accuracy and impartiality. They are now to be found in Service Establishments and Embassies throughout the world, and in the early years after the last war were much used by the League of Nations.

The old Handbooks have been extensively used in the present war, and experience has disclosed both their value and their limitations. On the one hand they have proved, beyond all question, how greatly the work of the fighting services and of Government Departments is facilitated if countries of strategic or political importance are covered by handbooks which deal, in a convenient and easily digested form, with their geography, ethnology, administration, and resources. On the other hand it has become apparent that something more is required to meet present-day requirements. The old series does not cover many of the countries closely affected by the present war (e.g. Germany, France, Poland, Spain, Portugal, to name only a few); its books are somewhat uneven in quality, and they are inadequately equipped with maps, diagrams, and photographic illustrations.

The present series of Handbooks, while owing its inspiration largely to the former series, is in no sense an attempt to revise or re-edit that series. It is an entirely new set of books, produced in the Naval Intelligence Division by trained geographers drawn largely from the Universities, and working at sub-centres established at Oxford and Cambridge, and is printed by the Oxford and Cambridge University Presses. The books follow, in general, a uniform scheme, though minor modifications will be found in particular cases; and they are illustrated by numerous maps and photographs.

The purpose of the books is primarily naval. They are designed first to provide, for the use of Commanding Officers, information in a comprehensive and convenient form about countries which they may be called upon to visit, not only in war but in peace-time; secondly, to maintain the high standard of education in the Navy and, by supplying officers with material for lectures to naval personnel ashore and afloat, to ensure for all ranks that visits to a new country shall be both interesting and profitable.

Their contents are, however, by no means confined to matters of purely naval interest. For many purposes (e.g. history, administration, resources, communications, &c.) countries must necessarily be treated as a whole, and no attempt is made to limit their treatment exclusively to coastal zones. It is hoped therefore that the Army, the Royal Air Force, and other Government Departments (many of whom have given great assistance in the production of the series) will find these handbooks even more valuable than their predecessors proved to be both during and after the last war.

J. H. GODFREY

Director of Naval Intelligence
1942

The foregoing preface has appeared from the beginning of this series of Geographical Handbooks. It describes so effectively their origin and purpose that I have decided to retain it in its original form.

This volume has been prepared by the Oxford sub-centre of the Naval Intelligence Division under the direction of Lieut.-Colonel K. Mason, M.C., M.A., R.E., Professor of Geography in the University of Oxford, and is the work of a number of contributors, whose names are given in Appendix V, page 762.

E. G. N. RUSHBROOKE

Director of Naval Intelligence
DECEMBER 1945

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CHAPTER XXI

GAZETTEER OF INLAND TOWNS

THE towns described here include capitals of provinces and towns of special historic, artistic, or industrial significance. A general account of Italian cities and towns is given in Chapter XIII, and damage to cities and works of art in the war of 1940-1945 is noted in Appendix I. In pronouncing Italian place-names, the accent as a rule falls on the penultimate syllable, e.g. Miláno, and is not marked in this chapter. Exceptions are indicated thus: Módena.

AGRIGENTO. Altitude 1,070 feet. Latitude 37° 18' N. Longitude 13° 35' E. Population 27,785. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site

Agrigento crowns a flat-topped ridge some 4 miles inland from Porto Empedocle, about midway along the south coast of Sicily. It is a centre of main routes, and this, combined with its importance as a tourist resort and agricultural market and its proximity to Porto Empedocle, has made Agrigento a busy commercial town. The main route along the south coast passes through Porto Empedocle, while routes converge on Agrigento from Palermo on the north and from Caltanissetta on the north-east. Agrigento is thus linked with the main routes throughout the whole island.

Agrigento extends from east to west along its ridge with steep, narrow streets sloping south from the summit (1,070 ft.). The present city covers the site of the acropolis, situated at the north-west corner of the ancient Greek city, of which the ruined temples remain to-day amidst the olive-clad slopes to the south-east.

History

Agrigento was the Greek Acragas and the Roman Agrigentum. From the Middle Ages until 1927 it was known as Girgenti, a name derived from the Saracen corruption of Agrigentum. The city was founded by colonists from Gela in the sixth century B.C. From 565 to 549 Phalaris ruled over it as a tyrant, having seized power with the aid of his workmen when engaged in the building of the temple of Zeus Polieus. He introduced the worship of Moloch, and among the cruelties which have made his name proverbial is that of

sacrificing victims to the god in a red-hot brazen bull. In the fifth century B.C. under the wise rule of Theron (488-472) Agrigento reached the zenith of its prosperity and power. Having defeated the



FIG. 1. *Major Inland Cities and Towns*

Carthaginians with the aid of his son-in-law, Gelon of Syracuse, Theron so enlarged and beautified the city that Pindar called it 'the fairest city of mortal men'. Later a republican form of government was set up under the influence of Empedocles, poet, physician, and philosopher, the most distinguished of Agrigento's citizens.

During this period the city was the chief emporium of the trade with Carthage. In 406 B.C. the Carthaginians under Hannibal and Himilco took and burned Agrigento after an eight months' siege, sending its art treasures to Carthage. The city was rebuilt but never regained its former prosperity, and in 210 B.C. it fell finally under the power of Rome. The Saracens conquered it in A.D. 828 and the Normans in 1086. Count Roger founded and endowed the bishopric, S. Gerlando, the builder of the cathedral, being the first bishop.

Public Buildings and Monuments

Agrigento occupies the site of the Greek acropolis, which lay to the north of the ancient Acragas. Thus the Greek temples (II, Plate 4), which are its chief glory, are at some distance from the present city. Outstanding among them are the Temple of Concord probably built by Theron (488-472 B.C.) and one of the best preserved of all Greek temples, the Temple of Juno Lacinia, smaller and slightly older than the Temple of Concord, and the vast Temple of Jupiter Olympius, which was left unfinished when the Carthaginians conquered the city in 406 B.C. Other classical remains of interest are the Casa Greca, a house rebuilt in the Roman period, the so-called Oratory of Phalaris, most probably a tomb, the Porta Aurea, or towngate, and the eight upright columns rising from the ruins of the Temple of Hercules, which is probably the earliest of the Agrigento temples (sixth century B.C.). Amid these monuments of antiquity is the thirteenth-century church of S. Nicola built from the remains of an ancient edifice. The cathedral of S. Gerlando is splendidly situated within the modern city. It is a fourteenth-century building, altered in the eighteenth century, and probably occupies the site of the Greek temple of Zeus Polieus. In the chapter-house is a very fine marble sarcophagus with classical reliefs portraying the story of Hippolytus and Phaedra. The Museo Archeologico contains some good vases, an archaic statue, representing either Apollo or the river-god of Acragas, fragments from the temples and other antiquities. The Rupe Atenea, a rocky hill crowned by the ruins of a temple, affords a magnificent view.

Industry

Agrigento, owing to its ancient ruins, is an important tourist resort. It is besides an agricultural centre for locally grown almonds, olives, and beans. Pasta and furniture are the chief manufactures,

though there are cement, lime, and sulphur works and rock-salt quarries in the vicinity.

Communications

Railways. The city has two stations, Agrigento Bassa and Agrigento Centrale. A single-track standard-gauge line runs from Porto Empedocle through Agrigento Bassa to Aragona-Çaldare, where lines diverge to Roccapalumba Alia, the junction for Palermo, and to Caltanissetta Xirbi, the junction for Catania. Narrow-gauge lines extend through Porto Empedocle to Magazzolo, junction for Castelvetro and Lercara, and to Margonia, junction for Canicatti and Licata.

Roads. Agrigento is on road 118 which leads to Palermo from road 115 along the south coast. Road 122 goes to Caltanissetta, whilst another main road runs north to Manganaro on road 121 and thus provides an alternative route to Palermo.

ALESSÁNDRIA. Altitude 318 feet. Latitude $44^{\circ} 54' N$. Longitude $8^{\circ} 39' E$. Population 51,949. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site

Alessandria is situated on the south bank of the Tanaro where its valley opens eastwards into the plain of Marengo, an embayment of the Northern Plain. On the south rise the Ligurian Apennines, on the south-west the Langhe, and on the north-west the Monferrato hills. The valley of the Tanaro separates the two latter and provides a routeway from Turin eastwards through Alessandria to Piacenza and the Plain north of the Po. This important west-east route is controlled by Alessandria, where it is joined on the south by three trans-Apennine routes, one from Savona along the Bormida valley, and two from Genoa, along the valleys of the Orba and Scrivia. To the north a main road traverses the east end of the Langhe to cross the Po at Casale Monferrato. The position of Alessandria has ensured its importance as a route centre and as a market for the fertile plain and foothills.

The strategic importance of Alessandria demanded strong defences. The city is built on low terraces dissected by the Tanaro, which defends it on the north, and by the tributary Bormida, which forms a defence line 2 miles south of the city and joins the Tanaro a little to the east. In the space between the two rivers elaborate defence works consisting of walls and pointed bastions surround the city on

the west, south, and east. Outer ramparts encircle the walls and on the south reach almost to the Bormida. Forts further strengthen these defences. The Cittadella, surrounded by a series of star-shaped ramparts, rises on the north bank of the Tanaro and guards the road-bridge across the river. On the south-east the Forte di Ferrovia protects the approaches and the extensive railway station and marshalling yards. A third fort guards the southern end of the bridge over the Bormida. Expansion immediately round the city has been limited owing to these defences, but large industrial suburbs have grown up, especially at Cristo to the west along the Turin road, and at Orti near the Tanaro on the east.

History

Alessandria is a monument of the resistance of the Lombard League to the Emperor Frederick Barbarossa in defence of communal liberties. Founded in 1168, it was built with the aid of funds supplied by the Norman King of Sicily and named after Pope Alexander III. The imperialists scoffed at it as a city of straw (*Alessandria della Paglia*), but in 1175 it withstood a six months' siege from Barbarossa, and thus vindicated its independence. At the Peace of Constance (1183) it was renamed *Cesarea*, as a condition of restoration to imperial favour, but the change of name was only temporary. Charles of Anjou established his overlordship over Alessandria in 1270, and its possession was disputed between the Angevin Kings of Naples, the Dukes of Monferrato, and the Visconti lords of Milan until it passed finally into the power of these last. It remained part of the duchy of Milan until it was acquired by Victor Amadeus II of Savoy in 1708. Napoleon incorporated it, with the rest of Piedmont, in France, and on his fall it was occupied by the Austrians, who destroyed its fortifications before restoring it to Savoy. Alessandria took a prominent part in the struggle for independence, notably in the rebellion of 1821 and the Mazzinian rising of 1833. The road system between Piedmont and Lombardy made it a place of strategic importance, and the first railway between Turin and Genoa, begun by Charles Albert and finished by Cavour, was designed to connect Alessandria with the capital and principal port of the Savoyard dominion.

Public Buildings and Monuments

The Cittadella, built in 1728, is the most interesting and prominent feature of the city. Alessandria has a richly decorated cathedral, built

in the nineteenth century, the old cathedral of S. Pietro having been demolished by the French in 1805 to make room for a vast Piazza d'Armi. The Palazzo Ghilino is a fine eighteenth-century building, once a royal palace and now the Prefettura. The thirteenth-century church of Sta. Maria del Castello retains its Lombard character despite much restoration.

Industry

Alessandria is the market for a fertile agricultural region and the collecting centre for locally produced silk cocoons and wines. The town is an important centre of the footwear industry and has at least four large firms, among which the S.A. Calzaturificio Succ. Bima has a capital of over 3 million lire. There are also cotton mills, an aluminium foil works, shell factories, and a large agricultural engineering works.

Communications

Railways. Alessandria is on the main line, double track and electrified, from the Mont Cenis tunnel and Turin to Genoa and Rome. It is the junction for a double-track line to Voghera, whence both Milan and Bologna are reached. A double-track line runs from Alessandria to Novara from which single-track lines diverge at Valenza for Vercelli, at Torreberetti for Pavia, and at Mortara for Milan. There are single-track lines to Moretta via Brà, to Savona via Acqui and S. Giuseppe di Cairo, and to Genoa via Ovada, the last two being electrified.

Roads. Alessandria is on the state road from Turin to Venice (10). Other state roads run from here to Vercelli (31), Genoa (35-bis), and Savona (30), whilst main roads lead to Valenza and Ovada.

Airfield. There is a landing-ground immediately north-east of the town.

AOSTA. Altitude 1,913 feet. Latitude 45° 43' N. Longitude 7° 19' E. Population 13,466. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site (Plate 2)

Aosta is situated midway along the Val d'Aosta, the east-west section of the F. Dora Baltea, which extends between the Gran Paradiso on the south, the Mont Blanc massif on the north-west, and the Pennine Alps on the north. The valley is one of the most important

routeways through the Western Alps from the Northern Plain to the frontier at the Little St. Bernard pass. Aosta stands where the Val d'Aosta widens at the junction of the tributary Valle de Artereva which comes down on the north from the Great St. Bernard pass and the Swiss frontier. The city has always been an important centre for traffic between Italy, France, and Switzerland, and was fortified by the Romans to protect the routes to the passes.

The site on the low terraces of the left bank of the Dora Baltea was well chosen for defence, being protected on the south by the main river, on the east by the tributary T. Buthier, and backed by the M. Fallere (10,043 ft.), the lower slopes of which are cultivated. Beyond the Dora Baltea, M. Emilius (11,676 ft.) and the Becca di Nona (10,308 ft.) rise steeply from the left bank of the river through fields, woodland, and scattered farmsteads.

History

Aosta was the chief city of the Gallic tribe of Salassi and was known by the name of Cordele. Its strategic position made it of great importance to the Romans. In 24 B.C. it was conquered by Terentius Varro, a general of the Emperor Augustus and renamed Augusta Praetoria. In the early Middle Ages it formed part of the kingdom of Arles or Burgundy. Later the Counts of Savoy succeeded in extending their sway over it, and the Dukedom of Aosta is to-day a cherished appanage of the Royal House. Its most famous citizen is St. Anselm, Archbishop of Canterbury (1034-1109).

Public Buildings and Monuments

Aosta is rich in Roman remains, of which the most important is the Triumphal Arch of Augustus. Sections of the Roman walls are well preserved and are surmounted by two medieval towers. The cathedral in its present form dates from the fourteenth century; its treasury contains a fine collection of medieval plate, including silver shrines of the thirteenth and fifteenth centuries. A bronze statue of Victor Emmanuel II by Tortone (1886) commemorates the king's Alpine hunting expeditions.

Industry

Aosta is a market town and a very important centre of the metallurgical industry. The S.A. Cogne has iron mines near by and produces pig-iron, special steels, and ferro-alloys. At their main plant in the town there are two 200-ton blast furnaces, two 50-ton electric

pig-iron and ferro-alloy furnaces of 800 kW. and 400 kW., Bessemer converters, special steel furnaces, induction furnaces, blooming mills, section mills, horizontal and vertical presses, and wire-drawing plant, &c. Their magnesium plant, operated by thermal processes, has an annual capacity of 3,000 tons of metal.

Communications

Railways. The line from Turin to Aosta is double track to Chivasso and single track onwards to Aosta. A single-track electrified line continues from Aosta to Pré St. Didier.

Roads. The main road from Turin to the Little St. Bernard pass (26) goes through Aosta, and a main road (27) branches off from thence to the Great St. Bernard pass.

Airfield. There is an airfield about a mile east of the T. Buthier between the railway and the north bank of the Dora Baltea.

AQUILA DEGLI ABRUZZI. Altitude 2,366 feet. Latitude $42^{\circ} 21' N$. Longitude $12^{\circ} 55' E$. Population 20,573. Provincial capital. Seat of archbishopric. Chamber of Commerce.

Position and Site

Aquila is the principal town of the Abruzzi. The plain which takes its name from the city separates Gran Sasso on the east from the Aquila plateau on the west, and is alined north-west to south-east along the middle Aterno. It consists of three basins, the terraced sides of which rise fairly gently to heights of 5,000 to 6,500 feet, the average height of the floor of the upper basin being about 2,250 feet, the middle about 2,100 feet, and the lower about 1,900 feet. Aquila stands above the Aterno between the middle and lower basins, but controls the routes converging on all three. The main route from Sulmona on the south goes through the lower basin to Aquila, where it diverges westwards from the Aterno through the middle basin to the upper Velino valley which gives access to Terni and Rieti. A main route along the Aterno from Aquila traverses the upper basin and then bifurcates, one branch continuing along the Aterno valley and crossing into the Amatrice basin, and the other climbing steeply across the watershed west to the Vomano valley and so to Teramo and the Adriatic coast. A route across the Aquila plateau links Aquila with Avezzano and the Fucino basin on the south.

The city stands on a sloping, steep-edged terrace rising about 164 feet above the east bank of the Aterno, and is surrounded by an

amphitheatre of hills. The main part is still enclosed by medieval walls and is roughly triangular in shape. From the station (2,005 ft.) on the valley floor on the north-west, and from the Porta Napoli (2,165 ft.) on the south-west the city slopes upwards gradually towards the Castello (2,366 ft.) at the eastern end. Suburbs have spread chiefly near the railway station and beyond the southern wall, but the surrounding slopes are dotted with scattered settlements.

History

Aquila was founded by Frederick II in the middle of the thirteenth century as a centre for the numerous castle-villages in the neighbourhood. According to tradition the city was divided into 99 *rioni* or divisions, each built by one of the 99 castles in the surrounding district, and had 99 *piazze*, 99 fountains, and 99 churches. Although this account of its origin is legendary, there are still some 60 churches, each with names connected with local castles, and once every day the city bell still rings 99 times. Aquila was destroyed by Manfred for disloyalty to the Ghibelline interest, but was rebuilt by Charles of Anjou and surrounded with walls. Pope Celestine V was enthroned here in Sta. Maria di Collemaggio in 1294. In 1424 the city was the scene of the final contest between the rival *condottieri*, Braccio and Sforza. Braccio laid siege to it in the interests of Alfonso of Aragon, and Sforza, in the service of Joanna of Anjou, advancing to its relief, was drowned in the Pescara. His young son, Francesco, the future Duke of Milan, assumed command and won a victory in which Braccio received his death wound and the siege was raised. Aquila became an important centre of the wool trade, having commercial relations with the principal Italian cities and even with France and Germany. It had its own mint and ranked as the second city in the kingdom of Naples. The internal struggle of rival families led to its decay. In 1315, and again in 1461, the city suffered badly from earthquakes, followed in 1478 by an outbreak of plague. In 1528 it was sacked and partly destroyed by the Prince of Orange, a general of the Emperor Charles V. In 1703 it was again ruined by earthquakes. Aquila fought for national liberty in the risings of 1831 and 1848.

Public Buildings and Monuments

Of the many churches in the city the most interesting are Sta. Maria di Collemaggio, a majestic Romanesque building containing the tomb of Pope Celestine V, and S. Bernardino, dating from the

fifteenth century, with an elaborate Renaissance façade. The cathedral of S. Massino has been rebuilt. The Palazzo Comunale has a museum of antiquities, and there are collections of pictures in the Palazzo de Torres Dragonetti and the Palazzo Persichetti. The Castello was built for the Emperor Charles V. Aquila retains its medieval walls and gates. Within the Porta Riviera may be seen the Fontana delle Novantanove Cannelle (99 spouts) enclosed in a courtyard of red and white stone.

Industry

Aquila is a summer resort and an agricultural centre. Industries are small and mainly connected with local products. Saffron of excellent quality is grown in the vicinity and processed locally. There are small establishments for pasta and knit-goods, as well as distilleries.

Communications

Railway. Aquila has a station on the single-track line from Terni to Sulmona. The light railway to Capitignano has been replaced by a motor-bus service.

Roads. Aquila is on road 17 from Rieti to Foggia, where it connects with state road 16. A road from Aquila by way of Teramo (80) joins road 16 farther to the north. Other main roads connect Aquila with Capitignano and Avezzano.

Airfield. There is a landing-ground $2\frac{1}{2}$ miles south-east of the town.

AREZZO. Altitude 971 feet. Latitude $43^{\circ} 28' N$. Longitude $11^{\circ} 54' E$.

Population 24,411. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site (Plate 3)

Arezzo stands at the south-eastern edge of the Arezzo basin. As the meeting-place of the Casentino, the Val di Chiana, and the Valdarno, and the routes following them, it is one of the most important route junctions in the Apennines. The Casentino opens into the basin on the north with the Pratomagno on the west and the Alpe di Catenaia on the east. The Val di Chiana opens on the south with the hills which stretch towards Lake Trasimeno on the east and the Mi. del Chianti on the west. Together these two valleys form a routeway linking the Northern Plain with the Tiber valley

and Rome. The Valdarno, into which the Arno turns from the Casentino, opens north-west of Arezzo between the Pratomagno on the north and the Mi. del Chianti on the south, and links Arezzo with Florence. Through the hills east of Arezzo another route winds along the transverse valley of the T. Cerfone into the upper Tiber valley and so to the Adriatic coast. To the west of Arezzo a route crosses the Val di Chiana and the Mi. del Chianti to Siena and the Tyrrhenian coast.

The site of Arezzo is a low isolated hill with the foothills of the Alpe di Catenaiia and their southern continuation forming a shallow amphitheatre on the east and south. The central and oldest part of the city is pentagonal in shape and is still enclosed by the ancient wall. It spreads down the western slopes of the hill from the fortress (1,053 ft.), which surmounts a low cliff. The modern city, with its industrial suburbs, extends over the floor of the basin west and south of the ancient nucleus and round and beyond the railway (840 ft.). The basin itself is intensively cultivated, chiefly with olives and vines, and Arezzo acts as the market for its fertile region.

History

Arezzo is of Etruscan origin, being one of the twelve confederate cities of Etruria. In 294 B.C. it submitted to Rome for the sake of protection against the Gauls and rendered important aid in the war against Hannibal, but in the Second Punic War it threw off the Roman allegiance. In the first century B.C. it became a Roman colony and Julius Caesar occupied the city after crossing the Rubicon. In A.D. 1098 its emergence as a free commune was marked by the election of its first consuls. Rivalry with Guelf Florence made Arezzo a stronghold of Ghibellinism, and at the battle of Campaldino (1289) it suffered a heavy defeat at the hands of the Florentines, the Bishop of Arezzo, Guglielmo Ubertini, being among the slain. The struggle continued in the fourteenth century when Arezzo under her fighting bishop, Guido Tarlati, supported the cause of the Emperor Henry VII. After a temporary submission to Florence in 1337, it was finally sold to the Florentines in 1384 by a French freebooter who had seized the city. Arezzo is noted for the number of her citizens distinguished in the arts. It is the birthplace of Guido d'Arezzo (c. 995-1050), the inventor of the musical scale, of Petrarch (1304-1374), of Leonardo Bruni (1370-1444), Chancellor of Florence and one of the leading humanists, of Pietro Aretino (1492-1566), and of Giorgio Vasari (1512-1574), architect, painter, and historian of art.

The patron saint of the city is S. Donato, a martyr of the persecution of Julian the Apostate in A.D. 362. An abortive rebellion against the French in 1798 was led by two peasants, one of whom was believed to be S. Donato returned to earth.

Public Monuments and Buildings

The cathedral, overlooking the valley of the Arno, was begun in 1277 and completed in the sixteenth century. It contains the tomb of Bishop Tarlati and a fine fresco by Piero della Francesca. The most beautiful church in the city is Sta. Maria della Pieve with its campanile and arcaded façade. The church of S. Francesco contains Piero della Francesca's famous series of frescoes depicting the Legend of the True Cross. The Museo Civico has an interesting collection of Etruscan, Roman, and medieval antiquities, and a small picture gallery.

Industry

Arezzo is a collecting centre for local produce, most notably silk-worm eggs. There are also some small industries, the most important of which are engaged in the manufacture of railway equipment, chemicals, paper, bricks, and tiles.

Communications

Railways. Arezzo is on the main double-track and electrified line from Florence to Rome. It is the starting-point for a single-track electrified line to Sinalunga (a junction for Siena), for a light railway through the Casentino to Stia, and for the narrow-gauge single-track Apennine Central Railway to Fossato di Vico, a junction on the Ancona-Rome line.

Roads. Two main roads cross at Arezzo, road 71 from Cesena over the Mandrioli pass to Orvieto and the south, and road 73 from Urbino to Siena. The main road along the Valdarno to Pontassieve and Florence (69, 67) is paralleled by a secondary road through Vallombrosa. Five miles along the road to Siena a main road branches off to Sinalunga and the south.

Airfield. There is an airfield 4 miles east of the town.

ASCOLI PICENO. Altitude 502 feet. Latitude 42° 51' N. Longitude 13° 35' E. Population 20,665. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site

Ascoli Piceno stands at the confluence of the Tronto and its tributaries, the Castellano and Chiaro, which flow into it from the south-west and north-west. The Tronto emerges here from its narrow upper course in the Mi. Sibillini into a wider but constricted valley between M. dell' Ascensione (3,502 ft.) on the north and the Mi. della Laga (5,505 ft.) on the south. The site of Ascoli is on terraces at the base of Colle il Giuseppe (1,283 ft.), an outlying spur of the Mi. Sibillini. The limits of the ancient city were formed by the hill-slopes on the west, by the Tronto on the north, and the meandering Castellano on the south and east. The medieval walls, still almost intact, reinforced the natural defences provided by the steep river-banks and hill-slopes. Within the walls the altitude of the city varies as it rises from the eastern wall (502 ft.) along the banks of the Castellano through the broad squares in the centre to the fortress (705 ft.) on the western wall. The modern city with industrial suburbs extends round the railway station (469 ft.) beyond the Castellano, and on the lower slopes of M. Rocco (1,309 ft.) between the Tronto and Chiaro. The situation of Ascoli has made it a marketing centre for the cultivated valley floor and an important route centre. The Via Salaria, which links Rome with the Adriatic coast, follows the valley of the Tronto and is joined in Ascoli Piceno by the main route from Teramo, Chieti and the south, and, $4\frac{1}{2}$ miles westwards, by the main route north to Macerata.

History

Ascoli Piceno was founded by the Sabines, and came under the power of Rome in 286 B.C. An early ally of the Romans, it turned against them, and played an important part in the Social War of 91-89 B.C., being conquered and sacked by Pompey Strabo. During the era of barbarian invasions it fell into the hands of first the Goths and then the Lombards, who attached it to the duchy of Spoleto. In 1185 it threw off the yoke of its bishop and became a free commune. Involved in the struggle between Papacy and Empire, it was sacked by Frederick II in 1242, and it also suffered from perennial rivalry with the neighbouring city of Fermo. Nevertheless it flourished, and the establishment of the naval station of Porto d'Ascoli, at the mouth of the Tronto, increased its importance. It is described in 1357 as one of the five 'greatest and noblest cities' of the Marches. By this time the commune had fallen under the

sway of the Malatesta and it was ruled by various local lords until, in 1502, it was incorporated in the States of the Church. In 1860, after a plebiscite held in Ascoli, a royal decree proclaimed its annexation to the kingdom of Italy.

Public Buildings and Monuments

The Roman period is represented by Porta Binata on the ancient Via Salaria which runs through the city. The cathedral is dedicated to St. Emidio, the first bishop and evangelist of Ascoli. The crypt dates from the eleventh century, but the whole building has been much restored. It contains an altar-piece (1473) by the Venetian painter Carlo Crivelli, who worked for some years in Ascoli. His well-known Annunciation, in the National Gallery, London, was painted in 1486 for the church of the Annunziata in Ascoli. The Palazzo Comunale has a fine thirteenth-century hall and a little picture gallery: its chief treasure is the magnificent embroidered cope, of thirteenth-century English workmanship, presented to Ascoli by Pope Nicholas IV, who was a native of the city. The restored Palazzo del Popolo houses an archaeological museum. The Fortezza Malatesta, founded in 1349, was rebuilt by Sangallo for Pope Paul III in 1540.

Industry

Ascoli is the market for a flourishing agricultural district, and acts as a collecting place for silkworms, silkworm eggs, olives, figs, corn, wine, hemp, and hides. The city is the principal centre in Italy for silkworm eggs, which are exported all over the world. The olive-oil, pasta, wine, and liqueur (*aniset*) industries are locally important, and there are small cotton and woollen mills. The chemical industry is outstanding, as the Montecatini group have here a large calcium carbide and cyanamide plant. The Venamatello and Castel Trosino hydro-electric stations in the Tronto basin provide power for local industries.

Communications

Railway. Ascoli is the terminus of the branch line from Porto d'Ascoli, on the main Adriatic coast line.

Roads. Road 4 (the ancient Via Salaria) from Rome to the coast at Porto d'Ascoli passes through Ascoli Piceno. West of the city, road 78 diverges from road 4 for Macerata. Road 81 runs from Ascoli Piceno to Teramo.

ASSISI. Altitude 1,391 feet. Latitude $43^{\circ} 4' N$. Longitude $12^{\circ} 37' E$. Population 4,686. Seat of bishopric.

Position and Site (Plate 4)

The Foligno depression lies between the Falterona chain on the east and the Martano ridge on the west. M. Subasio (4,249 ft.) rises steeply from the north-eastern edge of the depression with its level floor covered with vineyards, fields, and olive groves. Assisi, with its churches and crowded houses built of the local pink stone, crowns the green slopes of a spur of M. Subasio. The F. Tescio winds round the northern tip of the spur where the church of S. Francesco, supported by two tiers of arches, looks north over the plain. Roads from the plain up the western slopes of the spur give access to Assisi through medieval gateways in the enclosing wall. Steep streets lead up to the straight main street, which ascends from south-east to north-west through the city and passes through several squares. The summit of the spur is capped by the crumbling fortress of Rocca Maggiore, some 197 feet above the city. The site of Assisi has limited its expansion on the hill-slopes, but round the railway station, 2 miles away in the plain below, a small suburb has developed (I, Plate 121).

History

Assisi has an Umbro-Etruscan origin and was known to the Romans as Assisium. It was subject to the Lombard Dukes of Spoleto, who built a fortress there. In the twelfth century it became a free commune, and passed some two hundred years later under the control of the Papacy. Its history is bound up with that of its most illustrious citizen Francesco Bernadone, better known as S. Francis (1182-1226). In his day its leading citizens were actively engaged in commerce and they lived in a constant state of warfare with the neighbouring commune of Perugia. A year's imprisonment at Perugia, after one of these frays, turned Francesco's thoughts to religion and brought the pampered son of a rich merchant to embrace a life of poverty in the service of God and man. In 1209 S. Francis and his first companions received papal recognition as a religious Order. Not long afterwards Sta. Chiara, the daughter of another wealthy citizen, was professed by S. Francis as the foundress of the women's Order of Poor Clares. In 1224 the first Franciscan missionaries reached England. S. Francis was buried at his own request in the place where refuse was thrown outside the city walls. In 1228 the Vicar-General of the Franciscan Order laid the foundation stone of the great church

of S. Francesco over his grave. From that time forward Assisi has been a centre of the first importance in the history of art, and a resort of pilgrims from every part of the world. The parent house of the Franciscan Order in all its branches has remained here throughout the centuries.

Public Buildings and Monuments

The Roman Temple of Minerva with six well-preserved Corinthian columns is now a church. The cathedral is dedicated to S. Rufino, who evangelized Assisi and was martyred here in the third century. It dates from the twelfth century and has a fine Romanesque façade and campanile. The Rocca Maggiore which dominates the city was built by Cardinal Alborno in the fourteenth century upon the ruins of an earlier Lombard fortress. The church of S. Francesco comprises an Upper and Lower Church each with its own entrance upon a different level of the hill-side, and, underneath the latter, the crypt containing the shrine of the saint. The walls of both churches are covered with frescoes which include Giotto's series of the life of S. Francis and the allegorical representation of his marriage with poverty. The vast baroque church of Sta. Maria degli Angeli adjoining the railway station encloses the little oratory of the Porziuncola, round which the first Franciscan settlements were clustered. Among other Franciscan memorials are the church of Sta. Chiara, containing the embalmed body of the saint, and the little church of S. Damiano, which S. Francis restored with his own hands. Assisi to-day, enclosed within its walls and gates, remains an almost unspoiled example of a medieval city (III, Plate 8).

Industry

Assisi has few natural resources and, were it not a place of pilgrimage and a tourist centre, would remain a poor hill town. As it is, local handicrafts are lucrative. Artistic furniture modelled on Renaissance styles, wrought iron, pottery, lace, and embroidery are amongst the popular goods made.

Communications.

Railway. Assisi has a station (2 miles from the city) on the single-track line from Terontola (on the main Florence-Rome line) via Perugia to Foligno.

- *Roads.* The main road from Perugia to Foligno (75) passes Assisi station and connects with the city. There is a secondary road to Gualdo Tadino on the Via Flaminia (3).



PLATE 2. *Aosta*



PLATE 3. *Arezzo*



PLATE 4. *Assisi and the Rocca Maggiore*



PLATE 5. *Bologna: the towers of Asinelli and Garisenda*

ASTI. Altitude 407 feet. Latitude $44^{\circ} 53'$ N. Longitude $8^{\circ} 14'$ E. Population 26,476. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site

The broad valley of the Tanaro between Bra and Alessandria separates the Monferrato hills on the north from the Langhe on the south, and provides a natural routeway between the south-western and central sections of the Northern Plain. Asti, midway between Bra and Alessandria, is situated in a broadening of the valley of the Tanaro where, at the confluence of the tributary Borbore, the trend of the main valley changes from a south-west to north-east to a west to east direction. West of Asti the valleys of the lower Borbore and its tributary the Valle provide a passage for the main route from Turin eastwards through the Monferrato hills. East of Asti this route continues along the Tanaro valley to Alessandria and thence to Bologna and Genoa. Asti is the focus for minor routes converging from valleys in the Monferrato and Langhe hills, and from Cuneo and the south-western part of the Northern Plain through Bra and Alba along the Tanaro valley.

Asti, half a mile from the left bank of the Tanaro and built on terraces rising gradually towards the Monferrato hills, is well situated for defence. The Borbore flows close to the city on the west, while a mile away on the east another tributary of the Tanaro, the north-south Versa, flows across the broad valley floor. On the north, north-east, and west of the city beyond the Borbore the vine-clad slopes of the Monferrato hills rise to over 500 feet, while on the south, beyond the Tanaro, rise the green foothills of the Langhe.

History

Asti, or Hasta Pompeija, was a Roman colony on the Via Fabia. During the Barbarian invasions it passed to the Goths and then to the Lombards, who made it a dukedom under a Lombard Guastaldo. In the tenth century the Emperor Otto I put the bishop in command of the city and district, but by the twelfth century the citizens had achieved independence, and, as a centre of the cloth trade, Asti became one of the richest communes in Piedmont. It was a prey to the rivalries of its leading families and to the ambitions of neighbouring lords, such as the Marquesses of Saluzzo and Monferrato. In 1313, after prolonged struggles, the ruling family of Solari surrendered the city to Robert of Anjou. Later in the century it fell

to the Visconti lords of Milan, and in 1387 Duke Gian Galeazzo made it over to Louis Duke of Orleans as the dowry town of Valentina Visconti. Asti thus became the jumping-off place for French attacks on Milan. From 1494 it followed the fortunes of Milan, coming in turn under the rule of Louis XII and Francis I of France and the Emperor Charles V. The latter gave it to his cousin Beatrice, Duchess of Savoy, but it was not until 1575 that the House of Savoy finally secured possession of it.

Public Buildings and Monuments

The cathedral is a fine building completed in the fourteenth century. Among other notable churches are the Collegiata di S. Secondo (13th-14th century with an ancient crypt) and S. Pietro which has a Romanesque baptistery. The eighteenth-century Palazzo Alfieri was the birthplace of the tragic poet Vittorio Alfieri, whose statue adorns the adjacent Piazza. The palace contains memorials of the poet and a collection of antiquities and pictures.

Industry and Commerce

Asti is a collecting centre for locally produced silk cocoons and wines, it has a cattle market, and manufactures Barbera wine and wine casks. The most important industries include the manufacture of motor-cycles and their accessories, railway equipment, and agricultural machinery. The town also has small silk mills, potteries, brick works, and a match factory, whilst lace is made locally.

Communications

Railways. Asti is on the main Mont Cenis tunnel-Rome line, almost midway between Turin and Alessandria. The single-track line from Asti to Genoa via Acqui and Ovada is electrified. Other single-track lines run from Asti to Chivasso, to Mortara via Casale, and to Castagnole delle Lanze and Bra.

Roads. The main road from Turin to Venice (10) is joined at Asti by main roads from Chivasso, Casale Monferrato, Acqui, and Alba.

Airfield. Landing-ground at Azzano, 3½ miles east of Asti.

AVELLINO. Altitude 1,152 feet. Latitude 40° 54' N. Longitude 14° 47' E. Population 20,578. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site

Avellino stands in the centre of the Avellino basin, the undulating floor of which slopes up gradually through low hills to the steep surrounding mountains. These rise to over 4,600 feet, and their ascent is particularly abrupt to M. Vergine (4,167 ft.), which dominates the basin on the north-west. Routes enter the basin by valleys breaking through the mountain wall. The main route from Naples enters by the saddle at Monteforte Irpino (2,074 ft.) and divides beyond Avellino, east through the Mi. Picentini to southern Italy and north-east to the Adriatic along the valley of the Sabato. The main route from Salerno enters from the south by the valley of the Sarno and continues north of Avellino across the foothills (c. 1,300 ft.) of the Avella highland into the Benevento basin by the lower Sabato valley. Avellino is thus an important route centre, and it is also the market for the basin, which is well cultivated, especially with vines.

The city is built on terraces dissected by two east-flowing tributaries of the Sabato, the S. Francesco and the Rigatore. These limit the city on the north and south, and unite to form its eastern boundary. The city has spread chiefly west, and east beyond the confluence towards the railway station.

History

The present city of Avellino is medieval in origin, being built as a place of defence in the wars between Lombards and Greeks. Abellinum, the ancient Roman colony, lay east of the modern city near the village of Atripalda. After the Norman conquest of southern Italy Avellino formed part of the duchy of Apulia and was held by successive lords, who were either vassals or enemies of the Normans. Later it passed to the great Neapolitan house of Caracciolo, who enjoyed possession of it until 1844 and made it the centre of a court to which artists and poets resorted. The Caracciolo lord of Avellino took part in the naval victory of Lepanto (1571) and was raised to the rank of Prince as a reward for his services. The revolutionaries of 1820, under General Pepe, started from Avellino on their march to Naples.

Public Buildings and Monuments

The cathedral dates from the tenth century but has undergone successive restorations. The Palazzo della Dogana was restored by one of the Caracciolo princes and decorated with busts of Roman

emperors. Outstanding features of the modern city are the spacious Piazza della Libertà and the fine Botanical Garden.

Industry

Avellino is an important market for local produce, the most notable of which are various cereals, chestnuts, wine, and potatoes. Wine-making here has a long tradition and a school for the scientific study of wine production, founded in 1879, experiments with bottling wine. Felt hats are made in the city, whilst the production of building materials is locally important. There are sulphur mines near by.

Communications

Railways. Avellino is on a single-track line from Benevento to S. Severino Rota and thence to Naples and Salerno. A single-track line runs eastwards from Avellino to Rocchetta S. Antonio-Lacedonia, a junction for Foggia.

Roads. Avellino is an important road junction, being the meeting-place of road 7-*bis* from Naples and road 7 from Benevento to Potenza. Another main road (88) runs from Avellino to Salerno.

BELLUNO. Altitude 1,257 feet. Latitude 48° 8' N. Longitude 12° 14' E. Population 10,083. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site

The city of Belluno is the largest settlement in the Belluno basin. This long depression (25 miles long and 5-6 miles wide), through which the F. Piave flows, extends east-north-east to west-south-west. It is bordered on the north by the Belluno High Alps and on the south by the Belluno Sub-Alps which separate it from the Northern Plain. The basin connects with major valleys at each end: in the north-east it opens on to the north-south valley, formed by the upper Piave and Meschio-S. Croce valleys, with its through route from the frontier to the Northern Plain; in the south-west it has direct access to the Northern Plain and to the Adige valley through the Val Sugana. The main road and railway serving the Eastern Alps run through the basin, and the valley of the Cordevole, which enters it half-way along its northern side, provides another routeway to the north. The most convenient meeting-point in the basin for these routes is at Belluno, which lies midway between Ponte nelle Alpi, 5 miles to the north-east, and the entrance to the Cordevole

valley. The broad pebble-bed of the Piave with its shifting channels has few crossing-points, and one of the best is at Belluno. Here the basin is narrow and the right bank of the river, rising through terraced spurs to the foothills and the steep slopes of M. Serva (6,995 ft.) and M. Terne (5,719 ft.), offers a good defensive site. All these factors combine to make Belluno the natural centre of the province.

The city stands on the right bank of the river on ascending gravel and rock terraces deeply dissected by the Piave and by the Ardo which flows in from the north. The main part of Belluno, some 150 feet above the Piave, is within the angle formed by the right banks of the two rivers, but suburbs have spread beyond the Ardo.

History

Belluno has a pre-Roman origin, but its importance dates from the Lombard era, when Pemmo, Duke of Friuli, a native of Belluno, distinguished himself by his victories over the Slavs and set up a splendid court at Cividale. His sons Ratchis and Aistulf were in turn Kings of the Lombards (744–756). In the tenth century Belluno was ruled by a count-bishop, who held it as a fief of the Empire. Bishop Giovanni built the city walls and extended his territories as far south as Montebelluno. As a free commune Belluno was always the rival of Treviso, and the Da Camino lords of Treviso for a time established their authority over Belluno also. They were driven out by Ezzelino da Romano in 1249, and this great Ghibelline despot ruled over Belluno until his death. In the fourteenth century Belluno fell successively to Can Grande della Scala of Verona, Jacopo da Carrara of Padua, and Gian Galeazzo Visconti of Milan. On the break up of the Visconti dominions it passed to Venice, and, except for a brief interval during the War of the League of Cambrai (1509–1511), remained part of the Venetian mainland territory until the fall of the Republic (1797). During the French occupation one of Napoleon's generals was made Duke of Belluno; afterwards it was under Austrian rule until 1866. It was occupied by the Austrians for a year in the course of the War of 1915–1918.

Public Buildings and Monuments

Belluno is a pleasant little city with some fine Renaissance palaces and wide views. The cathedral of S. Martino is a sixteenth-century building with a notable baroque campanile by Juvara (c. 1732); it suffered damage from the earthquake of 1873 which destroyed the

old palace of the count-bishops (1190), now restored as the Tribunale. The Palazzo dei Rettori (now the Prefettura) was built in 1491, as the residence of the Venetian podestà; it has an elegant porticoed façade. The Municipio is a nineteenth-century imitation of a Gothic palace. Among other places of interest are the Gothic church of S. Stefano and the Museo Civico, containing a collection of coins and medals, and a few good pictures.

Industry

Belluno is an agricultural centre with a considerable trade in cattle, dairy produce, and fruit. The most important manufactures include wine, spectacles and eye-glasses, and agricultural machinery.

Communications

Railway. Belluno is on the single-track line from Calalzo-Pieve di Cadore to Montebelluna; here the line divides, one branch going to Padua and the other to Treviso and Venice.

Roads. Belluno is on road 50 which runs from Ponte nelle Alpi, on road 51 from Dobbiaco to Venice, to Primolano, on road 47 from Trento to Padua. Another main road, which is also a motor-bus route, goes from Belluno up the valley of the Cordevole to join road 48, west of Cortina d'Ampezzo.

Airfield. There is a landing-ground $2\frac{1}{2}$ miles north-east of the town and north of the Piave.

BENEVENTO. Altitude 443 feet. Latitude $41^{\circ} 8' N$. Longitude $14^{\circ} 45' E$. Population 26,692. Provincial capital. Seat of archbishopric.

Position and Site

Benevento is situated near the western end of the hilly basin which bears its name and is edged on the north by the Mi. del Sannio, on the east by the Neapolitan Apennines, and on the south and west by the Avella-Taburno highland. The basin is drained from east to west by the Calore, which is joined near Benevento by three tributaries. Of these, the T. Corvo deeply trenches the Avella-Taburno highland and is followed by the main route from Naples through the Caudine Forks. The second tributary, the F. Sabato, forms the boundary between the Avella-Taburno highland and the Benevento basin, while the third, the T. San Nicola, which flows north-east across

the Benevento basin, provides a direct route to the upper Calore valley and so to Foggia and south-east Italy. The Calore valley near Benevento is followed by no main road but by the main Naples-Foggia railway. To the north of Benevento routes follow the ridges, the danger of landslides making the valleys unsuitable for traffic. The most notable of the ridge-routes are those to Campobasso and Volturara Apulla. Benevento is essentially a route centre, and as such has been important since Roman times. In addition it is the market for the vines, olives, and agricultural products of its fertile basin.

The site of the city is on a hill (443 ft.) rising between the San Nicola on the east and the Sabato on the west, with the Calore meandering along on the north. The low hills (*c.* 755 ft.) rising beyond the rivers on the east (*c.* 350 ft.), west (*c.* 850 ft.), and south (M. Guardia 1,140 ft.) further strengthen its position. Parts of the wall which surrounded the ancient city remain, but the modern city has spread beyond it on all sides, the chief expansion being north beyond the Calore towards the Stazione Centrale (394 ft.; III, Plate 92).

History

The Samnite city of Malies became latinized as Maleventum. In 268 B.C. it was made a Roman colony and its name was changed to Beneventum, in memory of the victory won by the Romans over Pyrrhus near the city in 275 B.C. During the Second Punic War it twice fell into the hands of the Carthaginians and was sacked by Hannibal. The period of its greatest importance began with the foundation of the duchy of Benevento by a band of Lombards under their leader Zotto about A.D. 571. Save when Grimoaldo of Benevento was elected King in Pavia in 662, the Lombard Dukes ruled independently of the North Italian Kingdom, and their dominions comprised the greater part of southern Italy. The duchy reached the height of its prosperity under Arichis (758-787), who proclaimed himself Prince, and aimed at making Benevento a centre of civilization. Before his death, however, he was forced to come to terms with Charlemagne, and from that time the power of the Lombard principality waned. The Popes, the Eastern and Western Emperors, the Normans, and the aspirations of the citizens after self-government alike challenged its authority. In 1052 Leo IX obtained the grant of the city from the Emperor, and the princes were obliged to recognize the Pope as their suzerain. On the death of Landolfo VI in 1077 his dominions lapsed to the Church. The city remained a bone of

contention between the Popes and subsequent rulers of Naples, and in 1266 the battle of Benevento took place between Charles of Anjou and Manfred of Hohenstaufen, in which the latter was defeated and killed. The story of his death has been immortalized by Dante in the *Purgatorio*. After this, Benevento remained in the hands of the Papacy until the coming of the French. Napoleon made Talleyrand Prince of Benevento in 1806, but in 1814 he was obliged to surrender it, and Benevento was occupied first by Murat and then by the Bourbon Kings of Naples. The Congress of Vienna restored it to the Papacy, which kept it until 1860.

Public Buildings and Monuments

The monument of greatest interest in Benevento is the Arch of Trajan, one of the finest and best preserved Roman triumphal arches in Italy. It was erected in A.D. 114 to commemorate the opening of the Via Traiana, which diverges from the Via Appia outside the city, and is ornamented with bas-reliefs depicting the exploits of Trajan. Among Roman remains in the city are those of a theatre and a market. The little church of Sta. Sofia was founded by the Lombard Prince Arichis in 760, and retains its ancient Corinthian columns; it has a beautiful twelfth-century cloister. The cathedral of S. Fotino is a thirteenth-century building, incorporating fragments of Roman and Lombard architecture in its richly decorated façade. Its fine bronze doors are the work of a south Italian sculptor of the thirteenth century. The Castello, built in 1321 on the ruins of a Lombard fortress, contains the Museo Provinciale. Adjoining it is an attractive public garden, the Villa Comunale Umberto Primo. Of the Ponte della Maurella, beside which Manfred fell, only one support remains. The large modern church of the Madonna delle Grazie was built in 1839 as a votive offering after a cholera epidemic, the first stone being laid by the future Pope Leo XIII.

Industry

Benevento is an agricultural market and also a small industrial centre. The confectionery industry is noted for its chocolate, cakes, biscuits, and sweets. Several distilleries make *strega*, a local liqueur. The engineering industry is more important than usual for a southern inland town. Hardware is made, whilst the De Caterina works manufacture industrial and agricultural machinery. There are also several boot and shoe factories, brick and tile works, and furniture, hosiery, and match factories.

Communications

Railways. Benevento (Stazione Centrale, $\frac{3}{4}$ -mile north of the city) is on the main single track, electrified line from Naples to Foggia. There are single-track lines from Benevento to Vinchiatturo and Termoli, and to Naples and Salerno via Avellino and S. Severino Rota. A narrow-gauge electric railway runs from Benevento Centrale through Benevento Città and the Caudine forks to Cancellò.

Roads. Benevento is on road 7 (Via Appia) from Rome to Brindisi. Road 90 branches south of Benevento for Foggia. Other main roads run north from Benevento to join road 87 for Termoli and road 17 for Foggia.

Airfield. There is a landing-ground about 5 miles north-north-west of the town and east of the river Calore.

BÉRGAMO. Altitude 824 feet. Latitude $45^{\circ} 42' N$. Longitude $9^{\circ} 41' E$. Population 73,534. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site (II, Fig. 36)

Bergamo is situated at the foot of the Bergamasque Alps, where, between the Adda valley on the west and the Oglio valley on the east, three valleys, the Valle Brembana, Valle Seriana (F. Serio), and Valle Cavallina, open on to the Northern Plain. The city was originally built on the eastern slopes of a hill forming an isolated limestone outpost of the lower slopes of Canto Alto (3,760 ft.) which separates the Valle Brembana from the Valle Seriana. Now, however, Bergamo also extends over the high terrace of the Northern Plain at the foot of the eastern and southern slopes of the hill, and is thus divided into two distinct parts. The older, the Città Alta (1,201 ft.), stands on the hill with its crowded houses, towers, and domes, rising from green slopes and terraces, while the great walls and bastions surrounding it overlook the broad streets and squares of the modern city spreading over the plain below (II, Plate 30).

The position of the city at the edge of the Northern Plain makes Bergamo an important route centre. Close to the openings of a number of valleys, and at an equal distance from Milan on the south-west and Brescia on the south-east, it is a meeting-place for the routes from the valleys to the Northern Plain. The most important route runs from Milan to Bergamo, and thence along the Valle Cavallina and the Val Camonica to the Adige valley. The route from east to

west across the northern part of the Plain is continued from Brescia through Bergamo to Lecco where it joins the route from Milan alongside Lake Como to the Splügen pass.

History

Bergamo was known to the Romans as Bergomum and its history is similar to that of its near neighbour, Brescia. Originally one of the chief towns of Gallia Cisalpina, it suffered, as did Brescia, at the hands of Attila and the Lombards. Its government developed on traditional lines, passing from the rule of the bishop to the commune, and from the commune to the despot. The German Arnulf sacked the city in 894 and the Hungarians did the same during the following century. Bergamo supported the Lombard League against Frederick Barbarossa. In 1329 it submitted to the Visconti of Milan and a century later to Venice, remaining under Venetian rule until taken by Napoleon in 1797. One of Bergamo's most famous citizens is the *condottiere* Bartolomeo Colleone, who served the Republic of Venice, and whose equestrian statue stands in one of the main Venetian squares (II, Plate 15). Others are Girolamo Tiraboschi (1731-1794), the historian of Italian literature, Gaetano Donizetti (1798-1848), the composer, and Giovanni Morelli (d. 1891), the art critic. In Italian literature the Bergamese is a comic figure, the Harlequin of traditional drama.

Public Buildings and Monuments

The chief artistic treasures of Bergamo are in the old town (Città Alta) situated on the heights above the modern town (Città Bassa) and connected with it by a funicular railway. The Città Alta still has its medieval ramparts, which have been converted into promenades and afford fine views of the Alps and the Lombard plain. The cathedral has been rebuilt at various times, but the church of Sta. Maria Maggiore, dating from the twelfth century, is one of the finest Romanesque churches in Italy. Adjoining it is the Capella Colleone, built in 1470 in the early Renaissance style and containing the tombs by Amadeo of Bartolomeo Colleone and his daughter Medea. The fourteenth-century baptistery by Campiglionone was well restored in the nineteenth century. The Accademia Carrara in the Città Bassa contains three fine collections of pictures bequeathed to Bergamo by Conte Giacomo Carrara (1796), Conte Lochis (1859), and Giovanni Morelli (1891). While the strength of the two first lies mainly in pictures of the North Italian school, the Morelli collection has besides important Florentine and Umbrian works. In the neighbour-

hood of Brescia is the castle of Malpaga, built and decorated for Colleone in the fifteenth century.

Industry

Bergamo is an important provincial capital and the centre of a rich industrial region notable for its many textile mills (silk and wool), engineering, armament, and metallurgical factories, cement works, and dairies. The city acts as a business centre for these factories. Bergamo itself has some important engineering works and manufactures railway rolling-stock, industrial machinery, electrical equipment, measuring instruments, and shell components. There are several textile mills, the largest of which, the Cotonificio e Lanificio Oetiker, has a cotton and woollen mill with 12,500 spindles and 1,100 looms. The Italcementi have a large cement works in Bergamo.

Communications

Railways. Bergamo is a junction on the single-track line from Brescia to Lecco for the single-track line to Treviglio (junction for Milan and Cremona). At Ponte S. Pietro, 5 miles west of Bergamo on the Lecco line, a single-track railway diverges to Usmate, whence there are connexions with Milan and Seregno. Private railways run from Bergamo to Clusone and to S. Giovanni Bianco and S. Martino, this last being electrified.

Roads. The Autostrada from Turin to Brescia runs just south of Bergamo. Road 42 from Treviglio up the Oglio valley to Bolzano passes through Bergamo. Another main road runs from Bergamo to Lecco where it joins road 36, which extends along the east shore of Lake Como to the Splügen pass. Other roads connect Bergamo with Milan and Brescia.

Tramways. Electric tramways traverse the main streets of the Città Bassa, whilst inter-urban tramways extend from Bergamo to Milan via Trezzo and Monza and to Albino.

Airfields. There is an airfield near S. Pietro about $4\frac{1}{2}$ miles north-west of Bergamo, and another about 1 mile south-east of the city, but west of the F. Serio.

BIELLA. Altitude 1,391 feet. Latitude $45^{\circ} 38' N$. Longitude $8^{\circ} 4' E$. Population 24,328. Seat of bishopric.

Position and Site

Biella is at the edge of an embayment of the Northern Plain where the Pennine Alps rise steeply to the north. It stands at the entrance of

the narrow mountain valley of the Cervo and guards the entry to the Alpine section of the Elvo valley, close at hand on the west. These rivers and their tributaries flow on the south across the embayment which is bordered on the north-east and north-west by the Pennine Alps and on the west by the moraine at the mouth of the Val d'Aosta. The significance of Biella as a route centre is limited by the abrupt rise of a ridge of the Pennine Alps, extending from Mombarone (7,779 ft.) on the south-west through M. Mars (8,530 ft.) and M. Bo (8,323 ft.) to M. Barone (6,706 ft.) on the north-east. This ridge bars communications to the north, but Biella controls access to the sheep-walks of its southern flanks and is also the focal point of the fertile embayment, which is crossed from east to west by the main route in the Plain at the foot of the Alps.

The town of Biella is divided into two. The main and more western part, Biella Piano, with its industrial section, spreads west of the Cervo across a broad terrace to Biella Piazza, separated from it by a steep wooded rise. The upper terrace of Biella Piazza is surmounted by the sharp ascent of the foothills. To the north of the town the hills form an amphitheatre, which, between Cima Cucco (4,216 ft.) on the west and M. Trusto (2,740 ft.) on the east, is split by the narrow Cervo valley.

History

Biella Piano, the larger and older part of the city, is first mentioned in a document of A.D. 826. In the tenth century it came into the hands of the Bishop of Vercelli, who fortified it as a means of protection against Hungarian raids. When the citizens tried to throw off the yoke of the bishop he founded a new settlement on the hill above, which became known as Biella Piazza. Subsequently the two parts were united and developed communal institutions, as may be seen from the statutes of 1245. The citizens remained loyal to their episcopal suzerain until in 1348, under Bishop Giovanni Fieschi, the friendly relations between lord and city were interrupted and Biella placed itself under the protection of Archbishop Giovanni Visconti of Milan. The quarrel was patched up in 1373, and Fieschi regained possession, only to be seized by the citizens and imprisoned in the castle of Biella Piazza. Biella now sought the protection of Amadeus VI of Savoy (the Conte Verde), and from that time its fortunes were associated with those of Piedmont. In the sixteenth century it underwent a period of French occupation which ended in 1558; in 1647 it was sacked by the Spaniards and suffered great loss; in 1772 it was made

the seat of a bishop. Its most distinguished citizen is Quintino Sella (1827–1884), one of the architects of United Italy, whose statesmanship was directed towards making the new kingdom financially sound.

Public Buildings and Monuments

Biella Piano has been almost entirely modernized, but Biella Piazza retains much of its medieval character. The cathedral of Sta. Maria Maggiore is a Gothic edifice, begun in 1402, but rebuilt in 1772 when it became the seat of a bishop. Adjoining it is an interesting Romanesque baptistery dating from the ninth or tenth century. The Campanile of S. Stefano is all that remains of a church that was pulled down in 1872 to make room for the Palazzo Municipale. S. Sebastiano, in the classical style of the Renaissance (1504) with a modern façade, has interesting monuments and paintings. In Piazza Cavour is a monument to Quintino Sella by a Florentine architect. The Reale Istituto industriale Sella is one among several centres of instruction in commerce and industry. Various palaces in Biella Piazza, notably the Palazzo del Pozzo della Cisterna, bear witness to the building activity of the fifteenth and sixteenth centuries. The Sanctuary of Oropa, a famous pilgrimage resort in the neighbourhood, is the property of the commune of Biella.

Industry

Biella has been one of the chief woollen centres of Italy since the Middle Ages, and before the year 1940 had over 50 mills employing 6,000 persons, or about half of the town's industrial population. About five cotton mills of some size have recently been built in the town. There are also some small mechanical workshops.

Communications

Railways. A single-track line runs from Biella to Santhia, a junction on the Turin–Milan line. Narrow-gauge electric lines serve Valle Mosso, Masserano, and other textile centres in the hills near Biella. A double-track railway from Biella to Novara has recently been opened.

Tramways. Electric trams run from Biella to the Santuario d'Oropa, Borriana, and Mongrando. A funicular connects Biella Piano with Biella Piazza.

Roads. Numerous secondary roads radiate from Biella, whilst main roads lead to Arona, Borgosesia, Ivrea, and Cavaglia, whence other roads lead to Chivasso and Vercelli.

BOLOGNA. Altitude 180 feet. Latitude $44^{\circ} 30'$ N. Longitude $11^{\circ} 21'$ E. Population 232,980. Provincial capital. Seat of archbishopric. University. Chamber of Commerce. British Vice-Consul.

Position and Site (Fig. 2)

Bologna lies on the north-eastern side of the Apennines at a point where they are most easily crossed. The city extends along the Via Emilia between the valleys of the Reno and Savena which are followed by routes from Florence, Rome, and the south. Northwards another main route leads to Ferrara and the eastern part of the Plain. The importance of Bologna as a route centre has ensured its prosperity since Roman times. It has become the market for the rich vineyards, orchards, and fields of the fertile surrounding plain and hill-slopes, whence numerous minor roads converge on the city.

The northern part of Bologna is built on the plain and the city slopes upwards gradually towards the foothills of the Apennines. These rise close behind the city and their slopes are covered with villas, vineyards, hamlets, and churches. There is roughly 100 feet difference in height as the city ascends southwards from the railway station (144 ft.) through the ancient nucleus in the centre (180 ft.), on the Via Emilia, to the southern wall at Porto d'Azeglio (c. 230 ft.). On the south the lower slopes of the foothills rise steeply to the church of S. Michele in Bosco (440 ft.) and beyond to M. Sabbiano (1,282 ft.). Canals and irrigation ditches pattern the plain round Bologna. One of the larger watercourses, the Canale di Reno diverted from the F. Reno, enters the city from the south-east and turns north emerging into the Plain as the Canale Navile. The older city, hexagonal in shape, and dissected from east to west by the Via Emilia, is outlined by broad avenues marking the site of the ancient walls. Extensive suburbs, spreading west and east along the Via Emilia to the banks of the Reno and Savena, south up the lower slopes of the hills, and north beyond the railway and marshalling yards, have distorted the original shape.

History

The ancient Etruscan settlement of Felsina was known to the Romans as Bononia. It is believed that the change of name was due to the conquest of Felsina by the Gallic tribe of Boii in 391 B.C. The Romans enlarged the city and endowed it with baths, aqueducts,

and other buildings, but with the decline of the Empire it lost much of its prestige. During the period of Byzantine ascendancy it was overshadowed by Ravenna, the capital of the Exarchate, although it remained a centre of Roman civilization and of resistance to Byzantine influences. It was brought under papal suzerainty by the donations of Pepin (755) and Charlemagne (774). The real importance of Bologna dates from the twelfth century with the foundation of the university and the development of communal liberties. Its fame as a centre of learning arose from the teaching of Irnerius (c. 1090-1130) in Roman jurisprudence and of Gratian, the compiler of the collection of Canon, or ecclesiastical, Law known as the *decretum* (c. 1141). Students from all parts of Europe were drawn to Bologna in order to attend lectures and take degrees in Civil and Canon Law. Medical studies also developed early. Taddeo Alderotti, who lectured in Bologna from 1260 to 1295, was the first teacher of medicine to be given the title of doctor, hitherto reserved for the jurists, and in the fourteenth century the university was noted for its teaching of anatomy. Another distinguishing feature was the liberty accorded to women, both to graduate and teach, from very early times. In the fourteenth century Novella Calderini, the daughter of an eminent lawyer and herself a graduate, is said to have been so beautiful that she lectured with a thick veil over her face in order that her pupils should not be distracted from their work by her charms. In the course of the eighteenth century, women occupied the Chairs of Philosophy, Anatomy, and Greek Literature. The university added greatly to the prosperity of the city and fostered the spirit of political independence. The first circle of walls enclosed a relatively small space on either side of the Via Emilia stretching from Porta Ravegnana on the east to Porta Stiera, near the modern Hotel Brun, on the west, and from Porta Piera, by the church of Sta. Maria di Galliera on the north, to Porta Procola, near the church of that name on the south. Second and third circles were added in 1139 and 1330 as the needs of a growing population required more space. The circumference of the third set of walls is marked by the existing gates. Communal institutions developed early in Bologna. Consuls are mentioned in 1123, and the citizens elected their own Podestà in 1165, nearly thirty years earlier than Florence. The thirteenth century saw the capture of the government by the trade guilds and the organization of city companies for defence purposes. Yet the determination of the popes to make their authority a reality and the family feuds which divided the city



PLATE 6. *Bolzano*

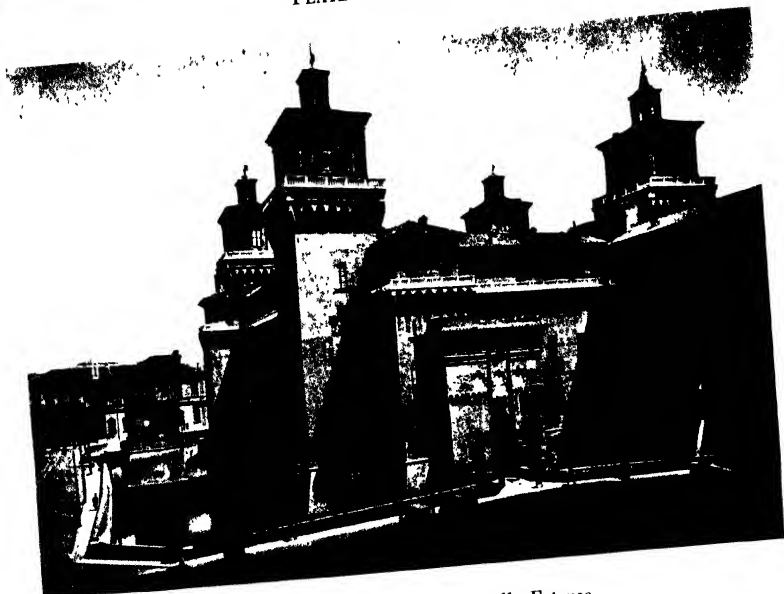


PLATE 7. *Ferrara: the Castello Estense*



PLATE 8. *Como*

proved fatal to independence. The rivalries of Lambertazzi and Geremei in the thirteenth century, of Pepoli and Maltraversi in the fourteenth century, and of Bentivoglio and Canetoli in the fifteenth century kept Bologna in a ferment, and played into the hands of its enemies. After a prolonged struggle the Bentivoglio triumphed over their opponents, and from 1446 to 1506 first Sante and then Giovanni wielded all but despotic power, with the title of leading citizen. Under their guidance satisfactory relations were maintained with the Papacy, the university flourished after a period of decline, and all the arts prospered. The expulsion of the Bentivoglio by Julius II ended the most brilliant period of Bolognese history. From that time until the French Revolution the city was governed by a Papal Legate assisted by a senate of Bolognese magnates; yet the old craving after independence remained and in 1793 Luigi Zamboni raised for the first time the Italian tricolour flag, the red and white of the Papacy together with the green of liberty. His attempt at rebellion cost him his life, but during the Napoleonic period Bologna enjoyed the benefit of free institutions, and, after the restoration of papal power in 1815, the spirit of revolt remained alive. The citizens rose in 1831, and again in 1848, inspired by the preaching of the Bolognese friar, Ugo Bassi, who was shot by the Austrians. In 1859 Bologna finally threw off the papal yoke and entered the kingdom of Italy.

Public Buildings and Monuments (Plate 5)

The most characteristic feature of Bologna are its porticoes, which project over the pavements on each side of the principal streets, protecting walkers from sun and rain. They belong to many different periods and some are elaborately sculptured, notably the fifteenth-century portico which flanks the church of S. Giacomo in Via Zamboni leading to the present university buildings. Surrounding the principal piazza is as fine a group of buildings as can be found anywhere in Italy. On the west is the massive pile of the Palazzo del Comune, dating from 1245. On the north, and separated from the Palazzo del Comune by the fountain of Neptune which gives its name to this part of the piazza, is the Palazzo del Re Enzo in which Frederick II's unfortunate son lived as a prisoner from 1249 to 1272. Adjoining it is the Palazzo del Podestà with a handsome Renaissance façade. On the east is the portico popularly known as Il Pavaglione, the favourite promenade of the citizens, and opening out of it is the Archiginnasio, or old University, an elegant building in the baroque

style (1562), which now contains the Biblioteca Comunale. On the south is the great church of S. Petronio, begun in 1390 in honour of Bologna's patron saint. The lower part of the façade is adorned with sculptures by Jacopo della Quercia, and the interior gives a striking impression of space and dignity. In 1530 it was the scene of the coronation of Charles V, the last emperor to be crowned in Italy. Next door to S. Petronio is the Palazzo dei Notai, a neat little brick and terra-cotta building (1381-1440) which bears witness to the prominence of the lawyer in Bolognese life. Conspicuous among Bologna's monuments are the Due Torri, built in the twelfth century and called after their founders Asinelli and Garisenda (Plate 5). If their ostensible purpose was defence, the chief motive of their origin was family pride. Both towers are out of the perpendicular, and we have Dante's evidence to show that the Torre Garisenda was leaning in his day. The cathedral of S. Pietro dates from the tenth century but has been rebuilt. Its west front is due to the munificence of Pope Benedict XIV (1740-1758), a member of the Bolognese family of Lambertini. Its primacy among Bolognese churches is largely usurped by S. Petronio. The church of S. Domenico contains the shrine of St. Dominic, who died in Bologna in 1221; various artists from the thirteenth to the sixteenth centuries contributed to this masterpiece of sculpture. S. Giacomo is the church of the Bentivoglio, where may be seen portraits of Giovanni Bentivoglio, his wife, and eleven children, and the tomb of Antongaleazzo, doctor of Law, a fine specimen of the lawyer tombs for which Bologna is noted. The Bentivoglio palace was razed to the ground in 1507, but the Palazzo Bevilacqua, built at the same period and at one time the property of the family, gives some idea of its style. The chief importance of the Accademia di Belle Arti lies in the collection of works by painters of the seventeenth-century Bolognese school—the Carracci, Guido Reni, and Domenichino, although to many the fifteenth-century paintings of Francia and Costa will give more pleasure. From the ancient monastery of S. Michele in Bosco, outside the southern gate of the city, a splendid panorama of Bologna may be obtained. The monastery buildings now house the Istituto Rizzoli, an orthopædic hospital of European fame. West of the city lies the mountain sanctuary of the Madonna di S. Luca, which is connected with the Porta Saragozza by an arcade 2 miles in length. Here there is preserved an ancient portrait of the Blessed Virgin, ascribed to the hand of St. Luke, and held in much veneration by the people of Bologna.

Industry and Commerce

Bologna, besides being engaged in the collection and processing of local agricultural products, is the commercial and industrial centre of Emilia. It is one of the chief centres of the hemp industry, and hemp, which has its own weekly market, is housed in large warehouses in the city. The food industry is particularly important and includes the manufacture of biscuits, chocolates, and other confectionery, preserved provisions, liqueurs, pasta, and sausages, milling, and rice polishing. *Ravioli*, a special kind of pasta, and the *mortadella* sausage are both famous. Bologna is the centre of the general engineering industry of Emilia and manufactures a wide range of products, the most notable of which are machine tools, precision instruments, carburettors, and gears. The firm which used to make the well-known Maserati racing cars now manufactures sparking plugs. Heavy engineering goods are made by S.A. Alessandro Calzoni, whilst S.A. Bolognese Industrie Elettromeccaniche e Fonderie Parenti is also an important manufacturer of machine tools and various types of factory machinery. The Societa Scientifica Radio Brevetti Ducati is well known for its radio and other electrical equipment. The Government also has an important arsenal. Other industries are, for the most part, not very large. The Montecatini combine has a super-phosphate works, and two soap factories make glycerine. The textile and clothing industries produce boots, shoes, gloves, and hosiery, whilst rope, sacks, and packing canvas are made of local hemp. Glass, china, paper, sealing wax, and shutters are also manufactured.

Communications

Railways. Bologna is important as a railway centre, being the junction for the following main lines: (1) Bologna–Milan, double track, electrified; at Piacenza a double-track line diverges for Genoa and Turin; (2) Bologna–Florence by the recently constructed Apennine tunnel and thence to Rome, double track, electrified; (3) Bologna–Ancona, double track, electrified, and thence along the east coast to Brindisi and Lecce; (4) Bologna–Venice, double track; (5) Bologna–Verona and the Brenner pass, single track, electrified, to Verona, double track, electrified, north of Verona.

The old line to Florence, single track, electrified, runs via Pracchia and Pistoia. There are single-track lines via Budrio to Portomaggiore and Massalombarda, and to Vignola.

Roads. Road 9 (Via Emilia) from Milan to Rimini runs through Bologna, where it crosses road 64 from Ferrara to Pistoia. Road 65

runs from Bologna to Florence. Other main roads lead to S. Giovanni in Persiceto, Molinella, and to Lugo and Ravenna. Numerous secondary roads serve the neighbouring parts of the Northern Plain and the Apennine foothills.

Tramways. There are steam tramways to Pieve di Cento and Malalbergo. Electric trams run to Casalecchio and serve the city and suburbs.

A *funivia* or aerial railway, starting from the Porta Saragozza, connects Bologna with the sanctuary of the Madonna di S. Luca.

Waterways. The Navile canal links with the F. Reno and is navigable by shallow-draught boats for part of the year.

Airways. The airfield, about 3 miles north-west of the city, west of the Reno, and north of the railway, was a calling-place on the service between Rome and Venice.

BOLZANO. Altitude 860 feet. Latitude $46^{\circ} 31' N$. Longitude $11^{\circ} 22' E$. Population 41,722. Provincial capital. Chamber of Commerce.

Position and Site (Plate 6)

The city of Bolzano owes its long-standing importance as a trading and industrial centre chiefly to its position in the broad fertile Adige valley at the point where the Talvera, Isarco, and Ega valleys converge on it. Bolzano is thus an important route centre, commanding the point where the through-route which links the Northern Plain with central Europe forks north-west along the upper Adige and north-east along the Isarco to the Brenner pass. A secondary road along the Ega valley provides a useful link with the main road through the Dolomites to the Piave valley; another up the Talvera valley (Valle Sarentina) provides the only route into the Mi. Sarentini. The Mendola saddle affords an opening in the steep western wall of the Adige valley for the main road to the west, and thus links Bolzano with the Valtellina and Lake Como and the Val Camonica and Bergamo. After crossing the Adige the ascent of this road to the Mendola pass (4,578 ft.) through Appiano (1,348 ft.) is made easy by the depression of the ancient valley of the river. From its early days Bolzano was a natural meeting-place for traders from the north and south. The prosperity they brought can be gauged by the city's fine buildings and by the ancient castles which overlook the valley from hill-spurs and river bluffs.

Like many Alpine settlements Bolzano is built on a dejection-cone, here formed by the rivers Talvera and Isarco, which, on emerging

from narrow gorges, enter the Adige valley. The main part of the city is within the triangle formed by the Isarco and the Talvera and the foothills of the Renon plateau. The city has spread beyond the original defensive site of the river confluence to include the prosperous suburb of Gries at the foot of M. Glania (4,019 ft.), which encloses the city on the north-west. One rail and three road bridges across the Talvera link Gries with Bolzano. The circle of hills is completed to the south-east by the lower slopes of M. Pozza (5,299 ft.) with the fantastic crest of Catinaccio on the horizon, and to the west beyond the Adige by the long Mendola ridge between M. Macaion (6,122 ft.) and M. Roen (7,106 ft.). On every side of Bolzano the terraced lower slopes are green with vines, fruit trees, fields, and woodland, and are strewn with hamlets and farmsteads (II, Plate 26).

History

The history of Bolzano goes back to Roman times, when as Bauzanum it was incorporated in the tenth Italian region. Under the Lombards it was included in the duchy of Trento, and when in 1027 the Emperor Conrad II created the ecclesiastical principality of Trento, Bolzano formed part of the bishop's dominions. His claims were disputed by the Counts of Tirol, a title which was yielded to the Habsburgs in the fourteenth century by Margaret Maultasch, the last representative of the earlier line of counts. In spite of constant pressure from the Habsburgs and their temporary occupation of the city in the fifteenth century, Bolzano remained under the Bishops of Trento until 1531, when Bishop Bernardo Clesio ceded it to the Habsburgs in exchange for other territory. It then became part of the County of Tirol until 1806 when Napoleon assigned it to Bavaria and, four years later, transferred it to his kingdom of Italy. After his fall it remained in Austrian hands until 1918, when Italian forces occupied it in accordance with the terms of the Treaty of London (1915). Since 1923 it has been included in the Compartment of Venezia Tridentina. The resistance of its mainly German-speaking inhabitants to Italianization has created a difficult minority problem (II, 233). An attempt to solve this was made in 1940 by giving the Tirolese an option of migrating to Germany, and by filling the places of those who accepted with Italians. It is uncertain how far this scheme has been carried out.

Public Buildings and Monuments

The centre of the city is the Waltherplatz (now Piazza Vittorio Emanuele), so called from the marble fountain in memory of Walther

von der Vogelweide, the thirteenth-century lyric poet (*minnesinger*) who was born in a nearby valley. At one end of the Piazza is the cathedral of the Assumption, a Gothic building with red marble lions flanking the west portal. The handsome campanile was erected in 1519 by a Swabian architect named Lutz. The most prominent secular building is the eighteenth-century Chamber of Commerce in the Italian baroque style. Near it is the Piazza del Erbe, the centre of Bolzano's important fruit market. The church of S. Francesco dates from the fourteenth century and has a beautiful cloister. Among modern buildings is the Palazzo Reale (1934), the residence of the Duke of Pistoia. The Palazzo Toggenburg is notable for its garden, and the promenade along the Talvera commands fine views, especially at sunset. The Museo, by the bridge over the Talvera, contains a collection of prehistoric remains and specimens of local art.

Industry

An important metallurgical industry has recently developed, including a small steel-works, two aluminium reduction plants, each with an annual capacity of 8,000 tons, a plant for the manufacture of artificial cryolite, one of the only two in Italy, and two magnesium plants, one belonging to the Montecatini combine. The Lancia company has a motor-lorry factory where iron and aluminium castings are also made. There are besides cotton and woollen mills, a match factory, and alcohol distilleries. The cotton mill of the S.A. Cottonificio di Bolzano has about 17,000 spindles and 120 looms.

Communications

Railways. Bolzano is on the double-track electrified line from the Brenner pass to Verona. There is a single-track line from Bolzano to Malles Venosta, electrified as far as Merano. Single-track electrified private railways go from Bolzano to Collalbo (standard gauge) and Mendola (narrow gauge).

Roads. Bolzano is on road 12 from the Brenner pass to Trento and Verona. Road 38 from Bolzano goes to Merano and the upper Adige valley. Road 42 passes through Bergamo to join road 11 at Treviglio. The main road along the Valle d'Ega joins road 48 in the Val di Fassa. The Valle Sarentina is served by a secondary road only.

Tramways. Electric trams run from Bolzano to the suburb of Gries, the starting-point of a funicular to Guncina (Guntschna).

From Bolzano there is an electric tramway to Vurza and Laives, a funicular to Virgolo, and a funivia or aerial railway to Colle (Bauernkohlern).

Waterways. The Adige is navigable in parts up to Bolzano.

Airfield. There is an airfield near S. Giacomo, about $2\frac{1}{2}$ miles south-west of the town.

BRÉSCIA. Altitude 489 feet. Latitude $45^{\circ} 32'$ N. Longitude $10^{\circ} 15'$ E. Population 92,583. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site

Brescia stands at the entrance of the Val Trompia where it forms a break in the foothills of the Brescian Alps at the edge of the Northern Plain. The wide floor of the entrance is patterned by the F. Mella and its tributary streams and drainage channels, and opens to the plain between the gradually rising slopes of M. Picastello (1,257 ft.) on the west, and the foothills of M. Maddalena (2,871 ft.) on the east. Brescia is built near the foot of the latter where the hill-spur of the Colle Cidneo (623 ft.), with its green slopes crowned by the ancient fortress of the Castello, dominates the city spreading round its base. The defensive possibilities of the site backed by hill-slopes were increased by walls and moats encircling the Castello hill and the city on their unprotected sides. Enough of these defensive works remain to indicate the rectangular layout, a legacy from Roman Brescia. The continued importance of the city is due chiefly to its position at the junction of the great route along the northern edge of the Plain from Vicenza to Milan and Turin, and the route from Piacenza and Cremona across the centre of the Plain, which continues into the Alps alongside Lake Garda to the Adige valley. Numerous minor roads converge on Brescia from neighbouring towns in the Plain. Brescia also controls the route which, north of the city, forks west along the industrial Val Trompia and east along a tributary valley into the Judicarian and Adige valleys.

History

The ancient Brixia, a place of Celtic origin, was of military importance in Roman times and was early famed for the manufacture of arms. The poet Catullus speaks of it as the 'mother' of his native Verona. It was sacked by Attila in A.D. 452, and became the capital of a duchy under the Lombards. During the Middle Ages its history

followed the usual course of Italian cities. Having been ruled by its bishop it emerged in the twelfth century as a free commune, and finally fell under the power of a single lord. Arnold of Brescia was one of the greatest medieval champions of liberty. Driven from his native city owing to his advanced opinions, he worked for the establishment of a Roman republic and the reform of the Church. He thus incurred the enmity of both Pope and Emperor and was burned in Rome by Frederick Barbarossa (1155). In the fourteenth century Brescia formed part of the Visconti dominions until in 1426 it was conquered by Venice. Save for a few years of French occupation (1509-1516), it remained Venetian until 1797, when Napoleon included the city in his Cisalpine Republic. In 1815 it was handed over to Austria, and in 1859 to Victor Emmanuel II. Three times over in the course of their history the Brescians rose against foreign conquerors and suffered cruel repression at their hands. In 1311 they rebelled against the Emperor Henry VII, who was forced to delay his coronation journey to Rome in order to reduce them to obedience. Having fallen to France in the War of the League of Cambrai they endeavoured to return to Venetian rule, and the city was besieged and sacked by the French general Gaston de Foix (1512). In 1849 Brescia alone of the Lombard towns rose in support of Charles Albert of Savoy. The punishment inflicted on the citizens by the Austrians under General Haynau earned him the name of the 'hyena of Brescia'. So notorious was his cruelty that when he visited England some years later he was recognized and manhandled by the workmen of a London brewery.

Public Buildings and Monuments

The Museo Patrio d'Età Romana (National Museum of Roman Antiquities) contains Brescia's greatest artistic treasure—the splendid bronze statue, over 6 feet high, known as the Winged Victory. The statue was found in the Temple of Vespasian (A.D. 72) and the remains of the temple are now incorporated in the museum. The fifteenth-century church of Sta. Giulia houses the Museo Medioevale which includes exquisite early Christian ivories and a processional cross of the ninth century set with gems; adjoining it is the ancient basilica of S. Salvatore founded by the Lombard King Desiderius. The Municipio, usually known as La Loggia, is a beautiful building begun in the early Renaissance style and completed in the sixteenth century by Sansovino and Palladio. The present cathedral (Duomo Nuovo) is of the baroque period, but the Duomo Vecchio, a circular building

of the twelfth century, is still standing. The principal Brescian painters of the Renaissance are Vincenzo Foppa (1430-1515), whose chief work was done in Milan, Moretto (1498-1555), and Romanino (1485-1566). The most important examples of the works of the two last may be found in the *Pinacoteca Tosio Martinengo* and in various churches in Brescia.

Industry

Brescia, itself an important industrial centre, is in an intensive industrial region. The city has been famous for its armament industry since the Middle Ages, and to-day holds a notable position in this branch of engineering. The Societa Italiana Ernesto Breda has in Brescia a factory, employing 2,400 workers (1939), where machine-guns, light anti-aircraft guns, anti-tank and field guns are made. There are several other armament factories, the largest of which, the Societa Metallurgica Bresciana, employed 3,000 workers in 1939 and included important metallurgical works with tube, bar, and cold rolling mills, and a wire-drawing plant. Other engineering factories make machine tools, cast-iron boilers, lorries and trailers (Fiat), weights and measures, and agricultural machinery. One steel works, the Acciaierie e Tubificio di Brescia, employed 1,500 workers in 1939 and made sections, nails, rivets, and welded tubes. Brescia is also a centre of the textile industry; the largest mills include eight silk-waste spinning mills with a total of 40,000 spindles belonging to Pietro Gavazzi, and a cotton weaving and stocking mill with 32,000 spindles owned by Calzificio e Cotonificio Reale Ferrai. The clothing industry is quite important, the principal garments manufactured being cotton stockings, ready-made outer clothing, shawls, and felt hats. Brescia is a notable centre of the tanning industry and has at least four tanneries. There is a fair-sized paper mill and a chemical factory. Food industries include the manufacture of pasta, chocolate, and liqueurs.

Communications

Railways. Brescia is on the main line from Milan to Venice. Single-track lines run from Brescia to Bergamo and Lecco, Iseo and Edolo, Parma, and Cremona.

Tramways. Electric tramways traverse the main streets of the city, and electric inter-urban tramways extend to Mantua, Poncarle, Soncino, Gussago, S. Colombano, and Salo and the west shore of Lake Garda.

Roads. An autostrada runs from Turin to Brescia and doubles State road 11 from Turin to Venice. Brescia is also on road 45-*bis* from Cremona to Trento, and is the starting point for main roads to Iseo and Darfo, Trento and Riva, Mantua, Parma, and Lodi.

CALTANISSETTA. Altitude 1,929 feet. Latitude 37° 30' N. Longitude 14° 3' E. Population 37,463. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site

Caltanissetta is built on the flanks of a ridge rising between the F. Salso on the east and a tributary valley on the west, down the slopes of which the town spreads. Almost in the centre of Sicily, routes from the coasts converge on Caltanissetta from Syracuse, Catania, Palermo, and Agrigento. Caltanissetta is thus an important route centre as well as one of the headquarters of sulphur-mining. The town is triangular in shape, its centre (1,929 ft.) being on the main east-west road. The built-up area slopes northwards to about 1,969 feet and southwards to about 1,804 feet, along a gradually narrowing ridge followed by a modern extension. Suburbs also extend east (c. 1,969 ft.) and west (c. 1,837 ft.) along the main road and down the slopes (c. 1,706 ft.) south-east towards the rock (1,837 ft.) crowned by the ruins of the Castello di Pietrarossa.

History

The name Caltanissetta appears to be derived from the ancient Nissa with the Saracen prefix of 'Kalat', meaning castle. Conquered by the Normans in 1086, Count Roger bestowed it as a fief on his son Jourdain. After the Aragonese conquest of Sicily it was granted to Corrado Lancia with the title of Count (1296), and in 1406 it passed to the Moncada family, who held it for several generations. Spanish influence predominated among the citizens, and in 1718 they showed opposition to Victor Amadeus of Savoy, to whom Sicily had been granted by the Treaty of Utrecht. The prosperity of Caltanissetta is of recent development and is based on its sulphur mines.

Public Buildings and Monuments

The cathedral of S. Michele is a baroque building (1570-1662) and its roof is decorated with frescoes by Borremans (1720). The Museo Civico, in the Municipio, contains antique vases and coins, as well as sculptures by local artists. Behind it lies the sumptuous but un-

finished Palazzo dei Tribunali. On a curiously shaped rock to the east of the town are the ruins of the Castello di Pietrarossa, a fortress which dates back to the Normans, if not to the Saracens. Below it is the fourteenth-century church of Sta. Maria degli Angeli, with fine portals, now forming part of the barracks. The most interesting church of Caltanissetta is that of the abbey of S. Spirito, standing on one of the surrounding hills, a building akin to the great Norman cathedrals of Sicily.

Industry and Commerce

Caltanissetta is a flourishing agricultural market, especially for corn, cotton, almonds, pistachio nuts, honey, and cheese, and is also the main centre for the refining of sulphur from numerous local workings. The chief industries are connected with the agricultural products and with sulphur. Confectionery and liqueurs are made, whilst flour is milled. Looking-glasses and harmonicas are amongst other products. The Royal School of Minerals has some local importance.

Communications

Railways. Caltanissetta Città is on the single-track line from Caltanissetta Xirbi to Aragona Caldare and Agrigento.

Caltanissetta Xirbi ($4\frac{1}{2}$ miles from the city) is on the main line, single track, from Palermo to Catania.

Roads. Caltanissetta is on road 122 from Agrigento to Stretto Benesiti where it joins road 117 for Enna and Gela. Road 122-*bis* connects Caltanissetta with road 121 for Palermo. Road 123 branches from road 122 at Canicatti for Licata. Secondary roads provide alternative routes to the main roads in the south.

CAMPOBASSO. Altitude 2,251 feet. Latitude $41^{\circ} 34' N$. Longitude $14^{\circ} 39' E$. Population 17,043. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site

Campobasso is situated towards the south-western end of the north-east to south-west trending ridge which cuts transversely across the mountains of the Molise, separating the parallel valleys of the Biferno on the north and the Fortore on the south. The watershed is dissected into lateral spurs by the tributaries of both rivers and ends 10 miles to the south in the depression of Vinchiaturro, beyond which rises the plateau of the Matese. The main ridge has a line of

settlements, built on the high slopes to avoid landslips, and is followed by the route from Termoli on the east coast to Naples on the west coast. The main route from Foggia across the centre of the Apennines to Aquila crosses the Termoli-Naples road at Vinchiatturo so that Campobasso has, for such a mountainous region, easy communications in all directions.

The site of Campobasso is on the southern slopes of a hill which rises precipitously from the valley of the Scarafone and is crowned by Castello Monforte (2,605 ft.) about 330 feet above the city. The original crescent-shaped nucleus of Campobasso clings closely round the slopes of the Castello, but the modern city descends to the road and railway (2,251 ft.) and spreads south and south-west along the ridge.

History

The old city of Campobasso clustering round its castle may date from the Lombard period. It first comes into prominence as a fief of the Monforte, Counts of Molise, who were persistent upholders of the Angevin cause against that of Aragon in the Neapolitan kingdom. The part played by Cola di Monforte, Count of Campobasso, in the succession war of 1458-1464 made it necessary for him to leave the country with René of Anjou. In France he became a soldier of fortune and won notoriety by his desertion of Charles the Bold of Burgundy before Nancy in 1477. The Monforte made their peace with the Aragonese kings only to fight again on the side of Charles VIII of France in 1494. On his withdrawal from Naples they forfeited their possessions, and Campobasso passed under a succession of lords until, in 1739, the citizens purchased their freedom. From this time the city began to expand beyond its original limits, and formal recognition was given to the new city by a decree of Joachim Murat in 1814.

Public Buildings and Monuments

The castle built by Cola di Monforte in 1458 on the site of an earlier fortress dominates the old town. It is now used as a reservoir of drinking-water. The adjoining church of the Madonna del Monte is an old foundation, but has been entirely rebuilt. It commands a fine view. The centre of the new town is Piazza Vittorio Emanuele with the Palazzo del Municipio as its principal building. Among other modern buildings are the Carcere giudiziario (1844-1861), said to be one of the best-run reformatories in Italy, the church of Sta.

Trinità (1829), and the Museo Sannitico, reorganized in 1912. Here may be seen a picture commemorating an interesting incident in the life of the city when in 1587, through the influence of a Lent preacher, peace was made between rival families and sealed by sixty-seven marriages which took place on the same day.

Industry

Campobasso is an important agricultural market and has small food-processing industries including the manufacture of pasta, butter, flour, and the distillation of liqueur. The city was once famous for its cutlery and there are still a number of firms engaged in making knives, razors, scissors, and swords which are marketed throughout Italy. The production of cement, bricks, and soap is important. Of less significance are local traditional handicrafts, such as the making of artistic pottery and the weaving of rugs and shawls.

Communications

Railways. Campobasso is on a single-track line from Benevento to Termoli. A single-track line runs from Vinchiaturò (on the Benevento line) to Carpinone.

Roads. Campobasso is on road 87 from Naples to Termoli. This is crossed at Vinchiaturò by road 17 from Aquila to Foggia.

CATANZARO. Altitude 1,125 feet. Latitude 38° 54' N. Longitude 16° 37' E.. Population 27,907. Provincial capital. Seat of arch-bishopric. Chamber of Commerce.

Position and Site

A high, wide terrace, gashed by parallel rivers flowing south-east, flanks the south-eastern slopes of the Sila between the F. Corace and the F. Tacina. Along this terrace, the highest of the coastal plateaux at the foot of the more abrupt Sila, is a line of settlements of which Catanzaro is the westernmost. The city crowns a steep-sided north-south ridge cut out of the terrace by the gorges of the Fiumarella (I, Plate 133) on the west and the Mosofalo on the east. These rivers join south of the city and are dry for most of the year. The rough, spurred valley-sides dropping 500 feet, steeply on the east and west and more gradually towards the river confluence on the south, provide natural defences for the city and have forced its expansion northwards. Here, beyond the Città railway station (1,109 ft.), the city dwindles into scattered buildings on a low southern spur

(1,532 ft.) of the Sila. Catanzaro, a centre more for administration and culture than for commerce, is nevertheless the meeting-point of important routes. It controls the western end of the route across the Catanzaro trough, an area of steep but low hills, between the Ionian and Tyrrhenian coasts of Calabria. At Tiriolo, a short distance west of Catanzaro, this route joins the important road from Reggio di Calabria to Naples and the north. On the east the Fiumarella valley provides an easy route to Marina di Catanzaro, whilst another along the southern spur of the Sila to the north of the city connects with the route along the southern edge of the Sila to Sta. Severina and the east coast at Crotona.

History

Catanzaro was originally a fortified town built by the Byzantines towards the close of the ninth century in order to strengthen their precarious hold on Calabria. Robert Guiscard conquered it in 1055, and it was granted as a county to various Norman lords, until William I of Sicily incorporated it in the royal demesne. In 1252 a certain Pietro Ruffio was invested with the city; his family remained in possession for nearly two centuries, and to them Catanzaro owes its greatest development. It was famed for its silk weaving, which was practised there as early as the eleventh century. In 1470 weavers from Catanzaro were sent to Tours to teach their art to the French, and the annual markets of their silks and damasks at Reggio attracted buyers from all over Europe. Its silk industry won for Catanzaro many privileges from the Aragonese and Spanish kings, and early in the sixteenth century it purchased its freedom, but from this time the ravages of war and a terrible outbreak of plague, in 1668, caused its prosperity to decline. In recognition of its successful resistance to the French forces under Lautrec, which besieged it in 1528, Charles V gave it the right to include the imperial eagle in its arms, with the motto *Sanguinis effusione*. Murat founded a college at Catanzaro to which Luigi Settembrini came as Professor of Rhetoric in 1835 and, himself inspired by Mazzini, did much to arouse a spirit of patriotism among the citizens. Catanzaro was known at one time as the city of the three V's, *Velluti*, *Vento*, and *Vitaliano*, i.e. velvets, wind, and its patron saint.

Public Buildings and Monuments

Catanzaro has no public buildings of particular artistic interest. The cathedral was consecrated in 1122, but it was almost completely

destroyed by an earthquake in 1783, and was rebuilt in the neo-classical style of the period. The church of S. Domenico, which was rebuilt in the sixteenth century, has a picture of the Madonna della Vittoria, commemorating the battle of Lepanto. The ruined castle, built by Robert Guiscard, and the Villa Margherita or public garden, command magnificent views. Near the entrance to the garden is the Museo Provinciale. Among modern buildings is the Seminario Pio X, a theological college founded by Pope Pius X.

Industry

Catanzaro is mainly an administrative centre, although olive oil is pressed and some silk spun locally. The chief industries of the province are in Crotone.

Communications

Railways. Catanzaro Città is a station on the narrow-gauge line from Cosenza to Catanzaro Marina (a junction on the Ionian coast railway from Metaponto to Reggio Calabria). Catanzaro Sala is the junction for this line and the single-track (standard gauge) line from Sta. Eufemia Lamezia to Catanzaro Marina. A funicular railway ascends from Catanzaro Sala to the city, and continues as a tramway. There is a tramway from Catanzaro to Pontegrande.

Roads. Catanzaro is on road 19 from Catanzaro Marina to Cosenza and the north. Road 19-bis branches from it north of Catanzaro to join road 18 along the west coast. Road 109-bis goes from Catanzaro to join, near Pentone, road 109 from Cosenza to Sta. Severina.

CHIETI. Altitude 1,083 feet. Latitude $42^{\circ} 21' N$. Longitude $14^{\circ} 9' E$.
Population 17,575. Provincial capital. Seat of archbishopric.
Chamber of Commerce.

Position and Site

Chieti stands on a ridge which extends from north-east to south-west, between the Pescara valley on the north and the valley of the Alento on the south. This ridge rises gradually from the narrow coastal plain on the east, and merges into the Maiella on the west. The main route from Pescara to Rome follows the valley of the Pescara river and is crossed by a route through the hills and parallel with the Adriatic coast from Ascoli Piceno and Teramo to Chieti and Guardiagrele. The route crossing is controlled by Chieti, which

stands almost 1,000 feet above the valley floor, and is the marketing centre for the vineyards, olive groves, and fields of the surrounding hills and valleys.

The town spreads over the level summit (1,083 ft.) of the ridge and on to adjoining spurs. One broad main road runs the length of the town from the extensive parks and surrounding public buildings at the western end to the older part of the city at the eastern end. Narrow streets slope down on either side towards the remnants of the ancient surrounding walls. A new industrial suburb has developed in the direction of the railway station.

History

Chieti is the modern representative of the ancient *Theate Marruciorum*, a place of considerable importance under the Romans. Its medieval history followed the usual course of south Italian cities and is without distinctive features. It was destroyed by the barbarian invaders, rebuilt by Theodoric, and came in turn under the sway of the Dukes of Benevento and the Normans. Its chief title to fame is its connexion with the Order of the Theatines, founded by S. Gaetano di Thiene and Gianpietro Caraffa in 1524. Caraffa was then Archbishop of Chieti, and he called his new Order after the Latin name of his see. He was one of the leading figures of the Counter Reformation and in 1555 became Pope Paul IV. Under his guidance the Theatines did much to reform the discipline and increase the devotion of the parochial clergy. The feast of St. Anthony Abbot is still observed in Chieti by a curious medieval ceremony. Men dressed as hermits and demons process through the streets and enter the houses, where they give brief representations of the saint being tempted by devils. The Good Friday procession, which can be seen in several Italian cities, is remarkable here for the artistic merit of its setting.

Public Buildings and Monuments

Roman remains in Chieti include the foundations of a theatre, and a temple which is incorporated in the church of SS. Pietro e Paolo. A Roman sepulchral temple from Chieti is now in the Terme Museum in Rome. The cathedral is of very ancient origin, but has been many times rebuilt; it preserves its tenth-century crypt and a campanile of 1335. The Palazzo Municipale contains majolica and some pictures by artists of the Abruzzi. In the principal street, the Corso Marrucino, are the Palazzo Arcivescovile dating from the fifteenth

century and various modern buildings. Among churches of interest are Sta. Maria Mater Domini and S. Antonio Abbate, with a fine medieval portal.

Industry

Chieti is an agricultural market with small industries of which the most notable are some small woollen mills and an establishment manufacturing agricultural tools. Its importance as a local industrial and commercial centre has been increased by the building of the railway.

Communications

Railway. Chieti Inferiore has a station on the single-track line from Rome to Pescara. This is connected with the city—Chieti Superiore—by a narrow-gauge electric railway $5\frac{1}{2}$ miles long.

Roads. Chieti Inferiore is on road 5 from Rome to Pescara. Road 81 from Teramo to Chieti Superiore is continued southwards by a main road to Guardiagrele. There are also secondary roads to Francavilla al Mare and Ortona.

COMO. Altitude 659 feet. Latitude $45^{\circ} 48' N$. Longitude $9^{\circ} 5' E$. Population 42,569. Provincial capital. Seat of bishopric. Chamber of Commerce. British Vice-Consul at Menaggio.

Position and Site (Plate 8)

Como, at the head of the western arm of Lake Como, occupies the flat floor of the deep gash forming the southern continuation of the lake. On the west rise the steep limestone heights of M. Croce (1,102 ft.) and Castello Baradella (1,430 ft.) and on the east of M. Ucellera (3,369 ft.). To the south, beyond the narrow corridor between the limestone hills of the West Lombardy Alps and the undulating hills of the moraines, rises M. Tre Croci (1,539 ft.). On the north access is easy to the routes along the shores of Lake Como and to Switzerland by Chiasso. On the south the corridor provides relatively easy routes to Varese on the west and Lecco on the east, but M. Tre Croci makes access to the morainic hills somewhat more difficult and causes the route to Milan to be deflected westwards.

The site of the town is on the low terraces and delta of the T. Cosia, which flows along the western and southern sides of the old town. This retains the rectangular layout of the Roman city, and is enclosed

by the remains of medieval walls and moat and on the north by the waters of the lake. West and south of the river outlying suburbs and villas are scattered over the surrounding hill-slopes.

History

Como was inhabited by a Gallic tribe when it was conquered by the Romans in the second century. Julius Caesar planted a colony here which included, among other citizens of the Empire, a number of Greeks, and the town rose to a position of considerable importance. The elder and the younger Pliny were both natives of Como. In the twelfth century Como waged a ten years' war with Milan in the course of which the former was destroyed. Like other rivals of Milan, it gave aid to the Emperor Barbarossa and was rebuilt at his orders. Throughout the Middle Ages it was distracted by the feuds between its rival families—the Ghibelline Rusca and the Guelf Vitani. In 1335 Franchino Rusca yielded the city to Azzo Visconti, and henceforth the history of Como is absorbed in that of Milan. In 1439 S. Bernardino of Siena visited the city and brought about a reconciliation between the rival factions, an event which was long commemorated by an annual festival. With Milan it passed under Spanish domination on the death of the last Sforza duke (1535), and was ceded to Austria in 1714, under whose dominion it remained until 1859. Among distinguished *Comaschi*, or natives of Como, are the historian Paolo Giovio (1483–1552) and the physicist Alessandro Volta (1745–1827).

Public Buildings and Monuments

The cathedral of Sta. Maria Maggiore was originally an eleventh-century building. For a time the people of Como were deprived of it through its incorporation in the citadel built by the Visconti, and when it was restored to them they rebuilt it at their own expense. The greater part of the work was carried out in the fifteenth century, although the dome was not finished until 1770. Built entirely of marble, it is declared by Symonds to be 'perhaps the most perfect building in Italy', owing to its harmonious blending of the Gothic and Renaissance styles. It contains some good pictures by Milanese artists including Luini and Gaudenzio Ferrari. The Museo Civico has a collection of Roman and prehistoric antiquities as well as a Sala Voltiana, containing instruments and other memorials of Como's great scientist. For the rest the attraction of Como lies in its natural beauty rather than in its buildings.

Industry

Como is famous for its silk industry, which was founded in 1510. It is the main Italian centre for twisting and weaving, while dyeing, finishing, and all other branches of the industry are important. Much of the silk worked is produced locally, although it also comes from all over Italy. Many types of goods are made including gauze, veiling, and parachute silk, whilst silk waste is spun and woven. Some of the most notable silk firms have mills in the city or its district, several of them belonging to the Fabbriche Italiane Seterie ed Affini, the second largest firm of Italian silk weavers. Although silk overshadows other industries, Como is a popular tourist centre and an agricultural market, as well as having food-processing industries and a large motor-cycle factory of national importance.

Communications

Railways. Como is on the main St. Gotthard line which is double track and electrified in Italy between Chiasso and Milan. Single-track lines run from Como to Varese and to Lecco and from the north station to Saronno and Milan.

Tramways. Electric tramways from the Piazza Cavour serve the city and suburbs, including Cernobbio, and run also to Lecco, Appiano, and to Milan via Cantù and Seregno. There is a funicular to Brunate.

Lake steamers. There is a service of steamers from Como up the western arm of the lake to Bellagio, and extending northward to Colico. The eastern arm has a service between Bellagio and Lecco. A local service plies between Como, Cernobbio, and Blevio.

Roads. Como is on road 35 from Milan to Chiasso and the St. Gotthard. Main roads run from Como up the west shore of the lake to join road 36 at Colico, up the east shore of the western arm of the lake to Bellagio, and also to Lecco, Bergamo, and Varese.

Seaplane station. A seaplane landing-place is near the town off the west shore of the lake.

COSENZA. Altitude 829 feet. Latitude $39^{\circ} 16' N$. Longitude $16^{\circ} 15' E$. Population 30,038. Provincial capital. Seat of archbishopric. Chamber of Commerce.

Position and Site

The north-south trough of the upper Crati valley between the Catena Costiera on the west and the Sila Grande on the east ends on

the south in the lower Piano del Lago, here dissected into an amphitheatre by a fan of tributaries of the Crati. Cosenza, at the confluence of the Crati and the Busento, is the focal point of this amphitheatre. Thus the city not only commands the main route from Naples and the north along the upper Crati valley, but also its extension to Catanzaro across the southern end of the trough, as well as the minor routes radiating from it. The main route is crossed at Cosenza by another from Paola on the west coast to Crotona on the east coast.

The ancient city occupies a picturesque and commanding site on a northern spur of the Piano del Lago, with the Crati at its eastern base, the Busento along its northern base, and the ravine of the Valle dei Sei on the west. The spur is crowned by the ancient Castello (1,257 ft.) and, 250 feet below, the old city, with crowded houses and twisting streets, descends steeply to the embankments at the confluence of the Crati and Busento. The city has expanded beyond both rivers, east of the Crati at the foot of the lower slopes of the Sila, and north over the level valley floor beyond the Busento and along the western bank of the Crati. Here the modern city, with broad streets and green squares, now forms the greater part of the whole.

History

Consentia, according to Strabo, was the capital of the Bruttians, but inscriptions and bronzes found there show the influence of Greek civilization. In 204 B.C. it was conquered by the Romans, and both Varro and Pliny speak in praise of its fruit and wine. Alaric the Visigoth died here in A.D. 410; according to tradition he was buried with all his treasure in the bed of the Busento, but searches made for the tomb have proved fruitless. It came in turn under the rule of Lombards, Greeks, and Normans, and in 988 was ravaged by the Saracens. During the Neapolitan succession wars it favoured the Angevin cause. Louis III of Anjou died here in 1435; in 1458 the peasants rose against the Aragonese, and the city also lent support to Charles VIII of France. In 1844 the brothers Attilio and Emilio Bandiera, sons of an Italian admiral in Austrian service, landed on the coast and tried to incite the people to rise against Austria, but they were captured and taken to Cosenza to be shot. The old city of Cosenza lay in the triangle formed by the rivers Crati and Busento, on the slope of the hill dominated by the castle; the earliest expansion was on the right bank of the Crati, and from the sixteenth century onwards a new city grew up on the left bank of the Busento.

Public Buildings and Monuments

Cosenza has few monuments of interest. The principal street of the old city is Corso Telesio, named after Bernardino Telesio (1508–1588), one of the earliest of Italian natural philosophers, who was born here. There is a monument to him by the railway station in the new city. The cathedral, in the Norman style, was consecrated in 1222, but was rebuilt in 1750. It contains the tombs of Louis III of Anjou, and of Queen Isabella of France, who died here in 1270 on her way back from Sicily. In the Teatro Comunale is the Museo Civico, containing objects from the prehistoric necropolis of Torre Mordilo, choirstalls from S. Domenico, and the banner of the Bandiera brothers, whose monument stands in the adjacent Piazza XV Marzo. In the upper part of the old city is the church of S. Francesco, dating from the thirteenth century, and above it the Castello, built by Frederick II, which has been recently restored.

Industry

Cosenza is the centre for a fertile region, where figs are among the most important crops and silkworms are largely cultivated. Figs, oranges, honey, and liquorice are the main goods marketed, and are sent throughout Italy. The industries consist chiefly of the processing of agricultural products and include the manufacture of olive oil and soap, the distillation of liqueurs, the making of wines, and the spinning of silk. The making of mosaics is a local speciality.

Communications

Railways. The State railway single-track line runs northwards along the Crati valley to Castiglione Cosentino ($4\frac{1}{2}$ miles), where one branch diverges to cross the Catena Costiera to Paola, and the other continues along the valley to Sibari. The narrow-gauge line of the Strade Ferrate del Mediterraneo runs south-west to Pedace (5 miles), the junction for Camigliatello. The main line continues southwards to Catanzaro and Catanzaro Marina.

Roads. Two main roads pass through Cosenza, road 19 from Salerno to Catanzaro, and road 107 from Crotone to Paola on road 18. There are secondary roads to Amantea and into the Sila.

CREMONA. Altitude 154 feet. Latitude $45^{\circ} 8' N$. Longitude $10^{\circ} 2' E$. Population 54,564. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site

Cremona stands in the fertile flood-plain of the Po near the north bank of the river at the eastward turn of one of the broad meanders which characterize this stretch of its course. These meanders limit the number of suitable crossing-places, and Cremona owes its origin and importance to the crossing of the Po here both by the southern route from Venice to Turin and the trans-Appennine route from Genoa to Brescia and the Alps. Numerous roads from the surrounding agricultural lands converge on Cremona, which has become a marketing (II, Plate 31) and industrial centre.

The city, dominated by its cathedral and tower, is set on a low terrace about a mile from the marshy fringes of the river. Like many of the other cities of the Northern Plain Cremona relied on artificial defences. A wall with square or triangular bastions, still standing on the east and south, surrounded the roughly oval perimeter of the city. The narrow watercourse of the Colatore Morbasco provided an additional defence on the west and south. Except for a small industrial extension south of the city, Cremona has spread chiefly on the west and on the north round the railway station.

History

Cremona was originally the home of a Gallic tribe, but it became a Roman colony during the Second Punic War. Destroyed by the barbarians in the fifth century, it was rebuilt in the seventh century by the Lombard King Agilulf. When it emerged as a free commune it was involved in constant feuds with its neighbours, notably with Milan. Local enmities account for the support which it gave to the Emperor Barbarossa in his struggle with the Lombard League. In 1311 it rebelled against the Emperor Henry VII under its Guelf leader Cavalcabo. The execution of an innocent citizen, Supramonte Amati, in punishment for the revolt, had the effect of making Cremona a centre of resistance to the imperial cause until it fell under the power of the Visconti. After a brief period of independence on the death of Gian Galeazzo Visconti it passed once more under the Milanese yoke, and was made the dowry town of Bianca Visconti on her marriage to Francesco Sforza (1441). During the fifteenth century Venice, seeking to bring her western frontier to the Adda, made repeated attacks upon Cremona. In 1499 she won the city as the price of her assistance to Louis XII of France, only to lose it ten years later. Henceforth the history of Cremona is merged in that of the duchy of Milan.

Public Buildings and Monuments

The most conspicuous monument in Cremona is the thirteenth-century campanile of the cathedral known as the Torrazzo, which is 364 feet high and is held to be the loftiest tower in Italy. In 1414 Pope John XXIII and the Emperor Sigismund visited Cremona and were taken up the Torrazzo by the local despot, Gabriele Fondulo. He never ceased to regret that he had lost an opportunity of winning perpetual fame by hurling them both down to the ground. The cathedral is a fine Romanesque basilica consecrated in 1190 but added to at later dates. It contains pictures by the Cremonese artist Boccaccio Boccaccino (1467-1525) and others. Outside the Porta Venezia, some 2 miles from the city, is the church of S. Sigismondo, which was the scene of the marriage of Francesco Sforza to Bianca Visconti, and was rebuilt by Sforza in honour of the event after he became Duke of Milan.

Industry

Cremona, the centre of an intensive agricultural region, where dairying is important, is primarily an agricultural market. The principal industries are connected with the manufacture of food. Confectionary is particularly important, the most notable products include almond paste, and nougat which is mainly exported. There are numerous dairies manufacturing cheese and butter, whilst meat preserves (*salumi*) of pork and beef produced locally are a speciality. Other industries include the weaving of silk, and the manufacture of agricultural implements, pottery, vinegar, spirits, and pianos. Cremona has long been famed for the making of violins and violas. Andrea Amati (1520-1580), Nicola Amati (1596-1684), Antonio Stradivari (1644-1737), and Giuseppe Antonio Guarneri (*b.* 1683) are among the most celebrated of the Cremonese who engaged in this craft, which is still important in the city.

Communications

Railways. Single-track lines run from Cremona to Mantua and Monselice, to Brescia (on the Milan-Venice line), to Iseo via Soncino, to Bergamo via Treviglio, to Codogno, and to Fidenza (on the Milan-Bologna line).

Tramways. There are tramways or light railways from Cremona to Ostiano, Asola, and Casalmaggiore.

Roads. Cremona lies on State road 10 from Turin to Mantua and Monselice. Road 45-*bis* runs from Cremona to Brescia. Other main

roads lead to Codogno (for Milan), Crema, Soncino, Casalmaggiore, and Fidenza.

Waterways. Cremona has wharves on the river Po.

CÚNEO. Altitude 1,752 feet. Latitude $44^{\circ} 23' N$. Longitude $7^{\circ} 33' E$. Population 18,852. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site

Cuneo is situated at the south-western extremity of the plain of Piedmont (I, p. 259), at the confluence of the Stura di Demonte and the tributary T. Gesso. It is shut in on the east by the Northern Apennines, on the south by the Maritime Alps, and on the west by the Cottian Alps. The importance of Cuneo arises from its position at the intersection of major routes and its consequent development as a market for the produce of the surrounding mountains and plain. Two main trans-Alpine routes, one from the west by the Maddalena pass through the valley of the Stura di Demonte and the other from the south by the Tenda pass, converge immediately south of Cuneo and proceed thence to Turin. These are crossed in Cuneo by a main road from the Valle di Maira, which, east of Cuneo, joins the routes from Turin across the Maritime Alps to the Mediterranean coast at Imperia and Savona. On the north there is easy access across the plain of Piedmont to Turin and also to Bra and thence through the lower Tanaro valley to Alessandria and the central section of the Northern Plain.

Cuneo takes its name from the steep-sided, wedge-shaped plateau on which it is built. This wedge, which extends north-east from the foothills of Punta Argentera, is cut out of a gravel terrace by the north-east-flowing T. Stura di Demonte and its tributary the T. Gesso. The wedge is limited on the east and west by the rivers, while their confluence forms its point. Standing high above the surrounding plain and defended on three sides by the gravel-strewn river beds and on the fourth by ground rising gradually towards the mountains, the city commands a very strong position. It has spread along the plateau, while suburbs lie below, chiefly near the railway stations on the river banks.

History

In 1198 Cuneo threw off the yoke of the Marquis of Saluzzo and proclaimed itself a free commune. It was engaged in a constant struggle with neighbouring feudal lords and was not long able to maintain its independence. For a time it was one of the Piedmontese

fiefs of the house of Anjou, under whom it enjoyed unwonted prosperity. In 1382 it passed to Amadeus VI of Savoy (the Conte Verde) and remained under the rule of his house with no other interruption than the French occupation of 1796–1814. As a border town, commanding the Col di Tenda pass into France, Cuneo was subject to repeated acts of aggression, and it experienced no less than seven sieges between 1542 and 1799. For its gallant defence against French forces in 1556 it was given the right to quarter the cross of Savoy on its arms.

Public Buildings and Monuments

Cuneo has no monuments of artistic importance. Both the cathedral and the Palazzo della Prefettura are nineteenth-century buildings. The fourteenth-century Loggia dei Mercanti di Grano in the Piazza Virginio bears witness to the early importance of Cuneo as an agricultural market. The thirteenth-century church of S. Francesco has a Renaissance portal in marble (1481). Cuneo's fortifications are converted into promenades, and a fine view may be obtained at the Madonna degli Angeli outside the city.

Industry

Cuneo is an agricultural market for the butter, cereals, and fruit of its surrounding region. It is also a flourishing centre of silkworm culture and is one of the principal Italian markets for silk cocoons, 4,180,000 lb. being sold annually in normal years. Industry is of secondary importance, although there are silk-reeling mills, small metallurgical and mechanical workshops, breweries, and cheese, mineral-water, pasta, chocolate, wax candle, and furniture factories.

Communications

Railways. Cuneo is on a single-track electrified line from Ventimiglia to Fossano, at which place it becomes double track to Turin. A single-track line runs from Cuneo to Saluzzo and Airasca, beyond which it is electrified to Turin. There are single-track lines from Cuneo to Mondovì, and to Borgo S. Dalmazzo via Boves; the latter is electrified.

Tramways. There are steam tramways to Borgo S. Dalmazzo and Demonte, Caraglio and Dronero, and Costigliole and Saluzzo. An electric tramway traverses the city.

Roads. Cuneo is on road 20 from Turin to Ventimiglia. South of Cuneo the road goes through French territory for a short distance.

Road 21 diverges from road 20 at Borgo S. Dalmazzo up the Stura di Demonte valley to the Maddalena pass and France. Road 22 from Acceglio and the Maira Valley passes through Cuneo to join road 28 north of Mondovi. Other main roads lead to Saluzzo and Pinerolo and to Fossano and Bra.

ENNA. Altitude 3,068 feet. Latitude $49^{\circ} 53' N$. Longitude $9^{\circ} 35' E$.
Population 21,261. Provincial capital.

Position and Site (Fig. 45)

Enna is situated in the centre of Sicily and almost midway along the Mi. Erei which form the watershed between the tributaries of the Salso on the west and of the Dittaino and its tributaries on the east. The town affords one of the finest examples of an Italian hill-town (II, p. 614), its site being on the summit of a ridge with precipitous slopes on all sides. From the fortress of Castello di Lombardia (3,261 ft.), at the narrow eastern point of the ridge, the closely built houses and steep narrow streets slope down towards the centre of the town (c. 3,117 ft.), from which streets lead southwards to the Torre Federico on its mound dominating the southern point. Much of the importance of Enna is due to its control of the gap in the Mi. Erei through which passes the principal inland route in the island from Catania to Palermo. Other routes, notably one from the north to the south coast, have been attracted to this gap, but none of them actually passes through Enna. The inaccessible site forces them round the lower flanks of the ridge to meet near the railway station (1,982 ft.) north-east of the town.

History

Long before the advent of the Greeks, Enna on its precipitous hill was a seat of the Sicels, and their myths, such as that of the rape of Proserpine, together with the cult of Demeter or Ceres, were intimately connected with it. The city is believed to have been founded by Syracuse in 664 B.C. For long it remained free until in 397 B.C. it fell into the hands of the tyrant of Syracuse, Dionysius I. During the First Punic War it was taken first by the Carthaginians and finally by the Romans (259 B.C.). A Servile War broke out here in 135 B.C., led by the slave Eunus, and the Romans only recovered possession of the city after a two years' siege. In A.D. 837 the Saracens tried in vain to storm the fortress, and eventually they took it by treachery, being brought into the city from a sewer through

which they crawled one by one. The Saracens named it Kasr Yani, whence the name Castrogiovanni by which it was known until 1927, when the old name of Enna was revived by Mussolini. The Normans were not able to gain possession of it until 1087. Under the Hohenstaufen it was a favourite residence of the Emperor Frederick II. Its later history is that of Sicily in general. Named the 'belvedere di Sicilia', it is the most interesting of the inland towns. Of recent years it has become an important military centre and a much favoured base for army manœuvres.

Public Buildings and Monuments

The two most notable buildings in Enna are the cathedral, dedicated to the Madonna della Visitazione, and the half-ruined Cittadella. Of the fourteenth-century cathedral only a portal and the triple apse survive. The building was restored after a fire in 1451, and a baroque façade was added. Inside, the chief features are the sixteenth-century columns of black alabaster and the unusually rich treasury. According to tradition it stands on the site of a temple of Proserpine. The Cittadella is known as Castello di Lombardia, probably from the Lombard colony established here by the Normans, and is built on the presumed site of a temple of Demeter. Originally it had twenty towers, but to-day only six remain, the best preserved being the Torre Pisana, from which a splendid view can be enjoyed, particularly at the hour of sunset. Other interesting monuments are the fifteenth-century palaces of Pollicarini and Pasquasia, the fine sixteenth-century campanile of S. Francesco, and the octagonal tower of the fortress built by Frederick of Aragon (1300) in the southern quarter of the town.

Industry

The importance of Enna has been greatly enhanced by the Fascists, who made it a provincial capital. Industry is of little importance, although Enna is a centre of the sulphur industry. The city is becoming known as a winter and summer resort, and its central position attracts visitors from Palermo, Catania, and even continental towns.

Communications

Railways. Enna has a station on the main line, single track, from Palermo to Catania. The station is 4 miles from the city and is connected with it by a motor-bus.

Roads. Enna is on road 117 which runs from Gela, on the south coast, to S. Stefano di Camastra, on the north coast, and on road 121 from Palermo to Catania. These two roads are combined as one between Enna and Leonforte (19 miles). At Stretto Benesiti, $7\frac{1}{2}$ miles south-west of Enna, road 122 to Caltanissetta diverges from road 117.

FERRARA. Altitude 30 feet. Latitude $44^{\circ} 51' N$. Longitude $11^{\circ} 38' E$. Population 58,187. Provincial capital. Seat of archbishopric. University. Chamber of Commerce.

Position and Site

Ferrara, its skyline dominated by the towers of the Castello, extends over a level stretch of the Northern Plain and is surrounded by a network of irrigation canals. The city stands 2 miles south of the important Po crossing at Pontelagoscuro, at the point where the route from Bologna and the Apennines joins that from Rimini and Ravenna to Monselice and the Venetian plain. Roads, railways, and canals from Comacchio and Codigoro link the coastal lagoons with Ferrara and so with the centre of the Northern Plain. Ferrara has been since early times, and still is, an important route and commercial centre and the market for the surrounding lands.

The main part of the city retains the pentagonal outline of the surrounding walls, bastions, and ramparts which once defended it, and of which considerable portions remain. Some vineyards are included in the north-western corner. An arm of the Po flows under the southern walls of the city and after widening into an oblong dock divides into the east-flowing Po di Volano and the south-east flowing Po Morto di Primaro, linking Ferrara with the Adriatic. Suburbs have spread south beyond the canal and west near the railway.

History

Ferrara was probably founded about A.D. 450 on the ruins of the Roman Forum Alieni, by the inhabitants of Friuli, driven from their homes by Attila and his Huns. Its walls were built by the exarch of Ravenna in 575. Charlemagne took it from the Lombards and included it in his Donation to the Papacy. This did not prevent the Saxon Emperors from disposing of it to Tebaldo of Canossa, one of their chief supporters in north Italy, whose son was made Marquis of Tuscany. On the death of Countess Matilda of Tuscany (1115), who left her lands to the Church, Ferrara was recognized finally as a papal fief. Its chief interest arises from its connexion with the house

of Este, marquises of the little town in the Euganean hills which bears their name, and one of the most ancient of Italian families. Azzo VII was recognized as lord of Ferrara in 1208, thus the Este were the earliest of Italian city despots. Ardent Guelfs, they were engaged in a fierce struggle with the Ghibelline tyrant Ezzelino da Romano, and his lieutenant Taurello Salinguerra succeeded in driving them from Ferrara. Only after Ezzelino's defeat and death at the battle of Cassano (1259) was Obizzo II firmly established in power. He ruled not only Ferrara but Modena and Reggio, and was succeeded by his son Azzo VIII.

The situation of Ferrara in the marshes of the Po, and controlling the river which was an important highway across Italy, made both its suzerain and its most powerful neighbour anxious to possess it. On the death of Azzo VIII in 1308, without legitimate heirs, Pope Clement V and Venice each supported a rival member of the Este family in the hope of themselves obtaining the city. When Clement's forces entered Ferrara, the government remained in papal hands, to the discomfiture of the Este candidate, until in 1317 the citizens rose and recalled their former lords. The Pope accepted his defeat and made the Este Vicars of the Church. The fifteenth century was the great age of Ferrara when, under the three sons of Nicholas III, the Este Castle with its moat and towers, still standing in the centre of the city, became the home of a brilliant Renaissance Court. Leonello d'Este was an enthusiastic humanist. In his reign the university, founded in 1391 by his grandfather Alberto, was reorganized in accordance with the new ideals in education, and scholars from all parts of Europe came to Ferrara to study Greek under Guarino. His successor, Borso, was invested by Frederick III with the duchy of Modena, after the latter's coronation as Emperor in Rome (1452), and, in 1471, attained the summit of his ambition by winning the title of Duke of Ferrara from the Pope. Ercole, the third brother (1471-1505), made Ferrara the home of poets. He was the patron of Boiardo, as his son Alfonso (1505-1534) was of Ariosto, while the third great poet of the Ferrarese Court was Tasso (1544-1595). In 1482 Venice and the Pope made a combined attack on Ferrara, with the intention of dividing the Este possessions between them, but they were frustrated by the loyalty of the Ferrarese to their ruling house and the intervention of other Italian powers. In spite of renewed attempts, under Julius II, to take possession of the duchy, Ferrara retained her independence until the elder line of Este died out in 1597. Renée of France, the wife of Duke Ercole II (1534-1559),

was deeply affected by the Reformation movement, receiving Calvin as her guest at Ferrara, and corresponding with him until his death. After Ferrara was merged in the States of the Church, the younger line of Este continued as Dukes of Modena up to the end of the eighteenth century, when the heiress, Maria Beatrice, married into the house of Austria.

The subsequent history of Ferrara was the same as that of the rest of the Papal States: it was an impoverished and neglected city which entered the kingdom of Italy in 1859.

Public Buildings and Monuments (Plate 7)

The most striking monument in Ferrara is the Castello Estense, in the centre of the city. Built for Niccolo d'Este II in 1385 and added to in the course of the sixteenth century, it is an impressive pile of red bricks, with towers at each corner, surrounded by a deep moat which is spanned by bridges. To-day it is little more than an empty shell, as its treasures were removed and its decorations allowed to perish after the Este moved their court to Modena. South of the Castello is the Palazzo Comunale, the thirteenth-century residence of the Este, but considerably remodelled. The beautiful Romanesque cathedral of S. Giorgio was dedicated in 1135, as an old verse on the façade records; the round-headed porch has a fine relief of St. George and the Dragon, while the unfinished Campanile of Verona marble dates from the fifteenth century. Ferrara is characteristically a city of palaces. The Palazzo di Schifanoia is a fourteenth-century building which was decorated for Duke Borso by the Ferrarese artists, Cosimo Tura and Cossa. The series of frescoes of the months gives opportunity for depicting the doings of Borso and his court at different seasons of the year. Biagio Rossetti built the Palazzo de' Diamanti for a member of the Este family (1493-1555); it is now the picture gallery of Ferrara with a notable collection of paintings of the Ferrarese school. Rossetti's masterpiece is the Palazzo di Ludovico il Moro, built at the orders of the Duke of Milan as a compliment to his father-in-law, Ercole II of Ferrara. The Palazzo Bentivoglio is a fine example of a sixteenth-century family mansion, built as a home for the ruling family of Bologna after their exile. The Palazzo dell' Università was built by Aleotti early in the seventeenth century and contains the Biblioteca Comunale, with the tomb of Ariosto and a valuable collection of printed books and manuscripts. The streets and squares of the city commemorate the great men who were natives of Ferrara. In the centre of the city is the Piazza Savona-

rola and leading out of it the Piazza Tasso. Nearby is the hospital of Sta. Anna, in which Tasso was confined during his madness. Ariosto's house is in the street which bears his name, and in the Piazza Ariostea is his statue surrounded by ilex trees.

Industry

The greater part of Ferrara's industry is connected with agricultural products. Sugar-beet is an important local crop, and there are several sugar factories and refineries, and alcohol distilleries dependent on them. Ropes and sacks are made from local hemp, large quantities of which are warehoused in the city.

There are large grain mills, whilst jams, jellies, candied fruits, chocolates, beer, liqueurs, and salted provisions are specialities. Bricks, tiles, cement products, china, glass, and earthenware are made mainly from local materials. The engineering industry includes the manufacture of ball- and roller-bearings, motor bodies, and electrical apparatus, whilst there are small iron and steel foundries as well as an important non-ferrous metal foundry which produces finished and semi-finished aluminium parts, chiefly for the aircraft industry. Boots and shoes, silk and cotton hosiery, umbrellas and parasols, wax, furniture, and chemical manures are amongst the other more important manufactures of Ferrara.

Communications

Railways. Ferrara is on the main double-track line from Venice to Bologna. Single-track lines run from Ferrara to Ravenna and Rimini, to Poggio Rusco for Verona and Mantua, to Cento and Modena, to Copparo, and to Codigoro via Ostellato, the junction for Comacchio.

Tramways. Electric tramways traverse the city. The tram to Pontelagoscuro has been replaced by a motor-bus.

Roads. Ferrara is on road 16 from Padua to Rimini and the east coast. Road 64 links Ferrara with Bologna and Pistoia. Other main roads lead to Modena, Poggio Rusco, Mantua, Adria, Codigoro, and Porto Garibaldi.

Airfield. There is a landing-ground about 2 miles south-west of the town.

Waterways. The Boicelli canal is navigable by 600-ton barges and gives direct access to the F. Po. The Burana canal links up with the F. Panaro and the Primaro canal with the F. Reno. The Volano canal, which gives direct access to the Adriatic, is undergoing reconstruction.

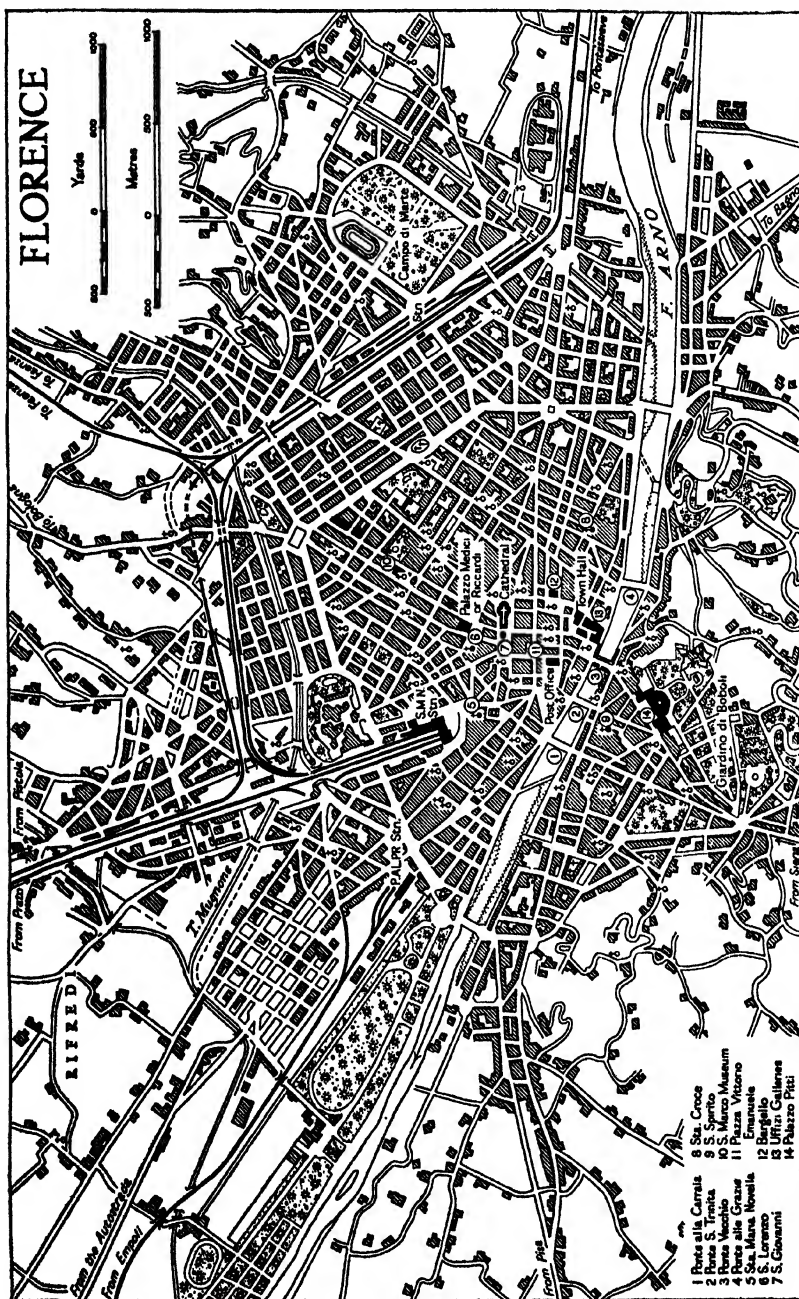


Fig. 3. Florence

FLORENCE (Firenze). Altitude 167 feet. Latitude $43^{\circ} 46' N$. Longitude $11^{\circ} 15' E$. Population 271,975. Provincial capital. Seat of archbishopric. University. Chamber of Commerce. Stock Exchange. British Consul.

Position and Site (Fig. 3; Plates 9-11)

Florence stands at the south-eastern end of the basin of Florence, which has long been of great importance because of its fertility and the number of routes leading into it across the Apennines from the Northern Plain. The Northern Apennines are here breached by six passes, all of which converge on the basin and ultimately on Florence itself. The nodal importance of the city is still further accentuated by the valley of the Arno. Near Florence the river changes from the south-north direction of its middle to the east-west alinement of its lower course. Florence is, accordingly, the meeting-place of trans-Apennine routes with routes from central and southern Italy along the middle Arno and from the Tyrrhenian coast through the lower Arno basin. On the south-west a relatively easy route skirts the northern flanks of the Mi. Chianti to the Siena trough and ultimately continues to Rome, while another extends north-east of Florence across the Apennines to Bologna. These two combined form the main road from Rome to the Northern Plain, and the control of its bridges across the Arno has ever since Roman times ensured the importance of Florence.

The city extends on either side of the Arno, but mostly on the north bank where the terraces are wider before the sharp rise up the neighbouring hills begins. The Roman city was a rectangle, stretching north from the ancient river crossing of the Ponte Vecchio, and centred on the Mercato Vecchio, the present Piazza Vittorio Emanuele. The great prosperity of the medieval city led to the building of a second and third circle of city-walls, of which the second already included, south of the river, a triangular suburb, closely surrounded by low hills (over 394 ft.). The line of the third wall is clearly marked by broad avenues (*Viali*), fragments of gateways, and the Fortezza di Basso on the north-west, where the T. Mugnone, a tributary of the Arno, provided an additional defence. The city has spread all round the Viali and particularly north-west beyond the Mugnone in the Rifredi industrial district. Isolated settlements are thickly scattered over the neighbouring hill-slopes, especially on the north towards Fiesole (1,132 ft.).

History

The early history of Florence is obscured in a mist of legend. Recent research, however, lends support to the tradition that it was founded by Etruscans from Fiesole, the Etruscan settlement being supplanted by a Roman military colony under the patronage of Mars. The colony grew into a little city named Florentia, built on the right bank of the Arno, and of some importance as a road centre. In 405 and in 541, Gothic invaders were twice defeated by imperial forces beneath her walls. With the introduction of Christianity St. John Baptist became the patron saint of Florence, and a church in his honour was built on the site of the former temple of Mars. During the Lombard domination Florence was ruled by a duke, for whom Charlemagne substituted a count. He himself spent Christmas 786 in Florence. In the ninth century Florence came under the sway of the Marquises of Tuscany, but the Bishop of Florence obtained some temporal jurisdiction over his diocese. The new monastic fervour of the tenth century found expression in S. Romualdo. Aided by the Marquis Ugo, he founded the Badia in Florence and the monastery of Camaldoli among the hills of the Casentino. Religious feeling ran so high that the reforming party, headed by Giovanni Gualberto, the monk of Vallombrosa, rose against the simoniacal Bishop of Florence and forced him to resign (1068). The struggle marks the emergence of the people of Florence as a political force, determined to manage their own affairs without outside interference. Another sign of political development is the association of citizen judges with the tribunals of the Countess Matilda of Tuscany. From the death of the countess (1115) and the disintegration of her territories, the Commune of Florence comes into being. Consuls are in existence by 1138, and in 1193 the head of the Florentine Commune is a Podestà, appointed by the citizens. Meanwhile, Florence rapidly extended her authority over the surrounding countryside, and the imperial diploma granted by Henry VI in 1187 gave formal recognition to the supremacy which she had won.

The thirteenth century is marked by the growing commercial activity of Florence, particularly in the cloth trade, and the dissipation of the energies of her leading families in faction fights. The assassination of the young noble, Buondelmonti, on Easter Day 1215, is held to mark the beginning of the struggle between Guelfs and Ghibellines. In 1248 the Ghibellines, supported by the Emperor Frederick II, drove out the Guelfs, but on his death in 1450 the latter party returned in triumph. During the ascendancy of Frederick II's son

Manfred the Ghibellines were again in power, but after his defeat at Benevento (1266) they were driven finally from Florence. Meanwhile the trading classes were acquiring fresh importance, and the appointment of the Capitano del Popolo (1250), together with the organization of a citizen army, marked their entry into political life. The old struggle between rival noble factions was merged in the new struggle between magnates and people, and opposing parties within Florence no longer called themselves Guelfs and Ghibellines but Black Guelfs and White Guelfs.

In 1282 membership of the chief magistracy was confined to members of the trade-guilds, while the Ordinances of Justice (1293) penalized the magnates in the interests of civic peace. Yet the rich and powerful were not easily subdued; the Blacks gained the upper hand and the Whites followed the Ghibellines into exile (1302). During the fourteenth century the magnates, comprising rich merchants as well as nobles, controlled Florence through the Parte Guelfa, a political club with wide governmental powers. The cloth trade rose to the peak of its prosperity and Florence went far towards establishing a hegemony over Tuscany. The growth of Florentine power and wealth from the twelfth to the fourteenth century is reflected in the expansion of the city. Cacciaguida, Dante's ancestor whom he meets in the Paradiso, describes Florence in the first half of the twelfth century as abiding in peace within her ancient circle of walls. These ran on the east from a fortress on the Arno near the Uffizi, past the Badia, and along the Via del Proconsolo; on the north they followed the Piazza del Duomo and the Via Cerretani, returning to the Arno on the west by the Via Tuornabuoni. The city was divided into four quarters: Porta Sta. Maria (S.), Porta S. Pietro (E.), Porta del Vescovo (N.), and Porta S. Brancazio (W.). The Mercato Vecchio, the forum of the Roman city, was the centre of Florentine life. In 1172 work began on a second circle of walls. These ran roughly from Ponte alle Grazie through Piazza Sta. Croce on the east; they encircled the church of S. Lorenzo on the north and returned to the Arno at Ponte alla Carraia; here they crossed the river, to include the important suburb of Oltr' Arno and passed through Piazza S. Spirito and Piazza Pitti to the southern end of Ponte alle Grazie. The city was now organized in *sesti* or sixths, the quarter of Porta Sta. Maria being divided into the *sesti* of Borgo and S. Piero Scheraggio, and the new *sesto* of Oltr' Arno being added. This was the Florence in which Dante grew up, but already in 1284 a more ambitious scheme was inaugurated. The third circle of walls

followed a line corresponding to the present Viali and included a large expanse not yet built over; walls and gates, some of which are still extant, were not completed until 1333. In 1343 Florence returned to the older system and was divided for administrative purposes into quarters—called after four of the principal churches: S. Giovanni (N.), Sta. Croce (E.), S. Spirito (S.), and Sta. Maria Novella (W.).

In 1378 a popular rising broke the power of the Parte Guelfa, but failed to establish a popular government. The leading commercial families ruled Florence, and preserved unity among themselves, in the face of economic and personal rivalries, by accepting the leadership of one of their number. The supremacy of the Albizzi, a family of cloth merchants, was followed by that of the Medici, wealthy bankers. From 1434 to 1494 Cosimo, Piero I, Lorenzo, and Piero II de' Medici were in turn the real rulers of Florence, although the forms of republican government cherished by the citizens were carefully preserved. This was the Golden Age of Florence when she made her influence felt throughout Europe both in politics and the arts, and her commercial activities embraced the civilized world.

In 1494 Piero II's inefficient handling of the crisis occasioned by the French invasion of Italy led to his expulsion from Florence. The form of the new constitution set up was determined by the preaching of the Dominican Friar, Savonarola, and until his fall (1498) Florence was a theocracy. In 1512 the Medici returned to power, and during the reigns of two Medici Popes Florentine affairs were directed from Rome. In 1527 the Florentines made a final bid for liberty, but the last Florentine Republic ended in the siege of the city by the combined forces of Pope and Emperor (1530). Alessandro dei Medici became Duke of Florence and married the Emperor's daughter. He was succeeded (1537) by his cousin Cosimo, the son of the famous *condottiere*, Giovanni delle Bande Nere. With the Emperor's support Cosimo also gained possession of Siena and in 1569 was created Grand Duke of Tuscany. The line of Medici Grand Dukes became extinct in 1737, and their dominions fell to the house of Lorraine Habsburg. Under Napoleon, the Grand Duchy passed to France and in 1815 it came back to the Lorraine family, with whom it remained until it became part of United Italy.

Tuscany played an insignificant part in the wars of liberation, although a Tuscan volunteer legion fought with splendid courage

at Castatone (1848). After the Peace of Villafranca (1859) the firmness of Bettino Ricasoli, the 'Iron Baron', frustrated the design of Napoleon III for a tripartite division of the Peninsula which would have included Tuscany in the Middle Kingdom. Florence, under Ricasoli's leadership, sacrificed her agelong love of autonomy, and on 20 March 1860 he was able to present to Victor Emmanuel II the result of a plebiscite in favour of the annexation of Tuscany to the kingdom of Savoy. The September Convention of 1864 bound the Italian Government to move from Turin to Florence within six months, and for over five years Florence was the capital of Italy. When the capital was transferred to Rome (1870) Florence suffered political eclipse and considerable financial embarrassment, but her intellectual and artistic supremacy remains.

Public Buildings and Monuments

Florence is an artistic treasure-house, and many of the best and most characteristic specimens of Italian architecture, sculpture, and painting are to be found within the city. The cathedral of Sta. Maria del Fiore, mainly a work of the fourteenth century, has an outer casing of white, green, and red marble, and is crowned by Brunelleschi's dome (1461; II, Plate 13). The present façade was finished in 1887 and represents one of the first important artistic enterprises undertaken by United Italy. Adjoining the cathedral is the lovely campanile known as Giotto's Tower, round the lowest story of which runs a remarkable series of bas-reliefs. The baptistery of S. Giovanni, an octagonal building of Roman origin, with three bronze doors executed by leading sculptors of the early Renaissance, completes the group. A no less important group of buildings comprises the Palazzo Vecchio, built by Arnolfo di Cambio (1298-1314) as the seat of the Florentine commune, the Loggia dei Lanzi, filled with sculpture, and the Palazzo degli Uffizi, which houses the Uffizi Picture Gallery, the State Archives, and, until recently, the National Library. The Gallery is connected, by means of a long passage forming part of the Ponte Vecchio, with the Palazzo Pitti, on the opposite bank of the Arno. Together they contain one of the greatest art collections in the world. Among the many churches, museums, and palaces in Florence the following are outstanding. The great Franciscan church of Sta. Croce (begun in 1294) is a Florentine Westminster Abbey containing the tombs or memorials of distinguished men such as Dante, Michelangelo, Machiavelli, the poet Alfieri, and the composer Rossini. The walls of the Bardi and

Peruzzi Chapels are covered with frescoes by Giotto, and Brunelleschi's beautiful Cappella dei Pazzi adjoins the Church. The Dominican church of Sta. Maria Novella dates, like much of the best Florentine architecture, from the last quarter of the thirteenth century. Ghirlandaio's frescoes containing portraits and scenes from the daily life of leading Florentines of the Renaissance, and the fine fourteenth-century frescoes by Andrea da Firenze in the Spanish Chapel, are among the several important series of wall-paintings to be seen here. The Museum of S. Marco, in the former Dominican Convent, is filled with the works of Fra Angelico; his frescoes adorn the convent walls and his easel-pictures are collected in the convent guest-chamber. The old palace of the Podestà, known as the Bargello, is now the Museo Nazionale and contains a splendid collection of Tuscan sculpture. The palace built for Cosimo dei Medici by Michelozzo has lately been made a museum of Medici remains; its chief treasure is Benozzo Gozzoli's series of frescoes in what was once the Medici private chapel. S. Lorenzo was the Medici parish church, and its Old and New Sacristies contain the family tombs including Michelangelo's famous sculptures. The stately palaces of the Via Tournabuoni, leading to the Ponte Sta. Trinità, give a general impression of the wealth and artistic taste of Florentine merchant families in the days of their greatest prosperity. Among the chief monuments on the south side of the Arno are the huge Palazzo Pitti, part royal residence, part picture gallery, and the churches of S. Spirito, Sta. Maria del Carmine, and S. Miniato. Broad, tree-lined Viali encircle the city, following the course of its ancient walls. The Viale dei Colli winds over the hills rising from the south bank of the river and broadens out into the Piazzale Michelangelo which affords a magnificent view of the city. One of the newest buildings in Florence is the Biblioteca Nazionale, in the Via Magliabechi, adjoining Sta. Croce, to which books were transferred from the Uffizi not long before the outbreak of the War of 1940-1945.

Industry

Florence is an important centre for the manufacture of a wide range of luxury goods. These are mainly connected with processing local products or with imitating the city's famous renaissance arts and crafts. There is a considerable manufacture of artistic furniture, pottery, porcelain, majolica ware, glass, mosaics, gold and silver trinkets, vellum, parchment, high-class paper, musical instruments, fancy leather goods, perfume, and sealing wax. Marble and metals

are also worked after antique models, and much fancy embroidery and lace made. Art printing and publishing also represent long-established activities. The making of straw hats and artificial flowers for their decoration is a feature of the city, whilst silk goods, hosiery, shoes, and gloves are other important articles of clothing manufactured. The most outstanding products of the food industry are pasta, flour, chocolate, beer, and crystallized fruit. The tobacco industry is important, and a great quantity of the famous Tuscan cigarettes are made.

The heavier industries are generally confined to the new industrial suburb of Rifredi. Here the Fiat combine have recently built a factory for aero-engines and frames, and the Officine Galileo, the leading Italian manufacturers of optical and precision instruments, have a plant employing about 5,000 persons. A small factory belonging to S.A. Pignone makes compressors, hydro-electric equipment, and diesel engines. The Montecatini combine manufacture sulphuric acid and superphosphates. Photographic films and sewing machines are amongst the other varied goods produced.

Communications

Railways. Florence is on the main line, double track and electrified, from Rome via Orte, to Milan via Prato, the Apennine tunnel, and Bologna. The old line to Bologna (single track and electrified) goes by Pistoia and the Reno valley. There is a double-track electrified line to Pisa and Leghorn via Empoli and a line, which is single track after Pistoia, to Pisa and Viareggio via Lucca. A single-track line runs from Florence to Faenza and Ravenna.

Tramways. The following places in the environs of Florence are served by electric trams: Fiesole, Sesto Fiorentino and Peretola, Campi and Capalle, Rifredi and Rovezzano to the north of the Arno; Lastra, Scandicci, Tavarnuzze, Grassina, Antella, and Bagno a Ripoli on the south side of the river.

Roads. There is an autostrada from Florence to the coast north of Pisa where it joins road 1. Road 2 (Via Cassia) runs from Rome to Florence, and road 65 from Florence to Bologna. Road 67 from Pisa to Forli, Ravenna, and the Adriatic passes through Florence. At Pontassieve roads 69 and 70 diverge from road 67 for Arezzo, 69 following the middle Arno valley and road 70 going through the Casentino or upper Arno valley. Road 66 beyond Pistoia links up with road 12 from Lucca to Modena and with road 64 by the Reno valley to Bologna. Another main road leads to Pistoia via Prato,

where a road along the Bisenzio and Setta valleys branches off to Bologna.

Airfield. There is an airfield at Peretola about 2 miles north-west of the city and east of the autostrada.

FÓGGIA. Altitude 230 feet. Latitude $41^{\circ} 27' N$. Longitude $15^{\circ} 33' E$. Population 57,234. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site

Foggia lies in the centre of the lowland of the Tavoliere di Puglia which is bounded on the north by the Gargano promontory, on the west by the Mi. della Daunia, and on the south by the plateau of the Murge. Rivers from the Apennines drain into the Tavoliere and flow north-east into the gulf of Manfredonia, which limits the plain on the east. As the centre of the Tavoliere, Foggia is chiefly important as a focus of routes, for its industries, and as a market for the surrounding plain. At Foggia the main Adriatic coast road is joined by routes from Aquila and the basins of the Central Apennines on the west, from Avellino and Naples on the south-west, and from Manfredonia and the Gargano promontory on the north-east. Numerous minor roads and tracks converge on Foggia from the pastures, fields, and vineyards of the surrounding plain.

The site of the city is in the centre of the open plain where it begins to rise gradually westwards towards M. Croce (925 ft.), an outlying foothill of the Mi. della Daunia. The rectilinear layout of the centre of Foggia betrays its Roman origin, but the broad streets, spacious squares, and industrial suburbs spreading round it indicate its development as a modern city.

History

Foggia is first mentioned in the eleventh century when it is said to have been founded by the people of the ruined town of Arpi, some 5 miles distant. The name may be derived from the 'fosse' or underground chambers for storing corn, for which the city is famous. Frederick II built a castle at Foggia, which became one of his favourite residences. In 1447 Alfonso of Aragon made Foggia the seat of the *Dogana di Puglia*, or place of toll for the flocks which passed backwards and forwards each year from their summer pastures in the Abruzzi to the plains of Apulia. These tolls were, for centuries, one of the most lucrative sources of revenue of the Neapolitan kings.

In 1798 Foggia supported the Republican cause, and was sacked in the following year by Cardinal Ruffo's army of the Holy Faith, sent from Sicily to stamp out the Parthenopean Republic in Naples.

Public Buildings and Monuments

Foggia was almost entirely destroyed by an earthquake in 1731, and is to-day a modern city. The cathedral of Sta. Maria Icona Vetere, founded by William I in 1170, is a baroque restoration retaining the lower part of the façade and the crypt of the Norman building. Of Frederick II's palace, in which Charles of Anjou died in 1285, only a portal with an inscription of 1223 survives. The Palazzo de Rosa has an elegant Renaissance loggia.

Industry

Foggia is an important market for local agricultural products, most notably grain, wine, oil, and wool. As a result there are flour mills, pasta factories, and small olive-oil refineries. The usual industries of the larger south Italian towns are also found, though the engineering workshops are somewhat bigger than normal, and the saw-mills more numerous. Cellulose is made from straw and is used in the paper-mills of the Istituto Poligrafico dello Stato. There is also a small chemical industry, the most notable products of which are chlorine, caustic soda, phosgene, and gunpowder.

Communications

Railways. Foggia is on the main Adriatic coast line, on the double-track portion between S. Severo and Bari. An electrified line (double track only as far as Cervaro) runs from Foggia to Naples; the line from Cervaro to Potenza is single track, whilst other single-track lines run from Foggia to Lucera and Manfredonia.

Roads. Foggia is on the main east coast road 16, which runs from Padua to Sta. Maria di Leuca. Road 17 leads from Foggia to Campobasso, Aquila, and Rieti. Road 89 runs to Manfredonia and round the promontory of M. Gargano to rejoin road 16 at S. Severo, and road 90 to Benevento.

Airfields. There are numerous airfields in the vicinity.

FORLI. Altitude 111 feet. Latitude 44° 13' N. Longitude 12° 3' E. Population 33,505. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site

Forlì is situated on the Via Emilia where it crosses the F. Montone shortly below its confluence with the F. Rabbi. On the east bank of the river and near the southern edge of the Northern Plain, Forlì controls the trans-Appennine route from Florence along the Montone valley and its continuation across the plain to the Adriatic coast at Ravenna. From its position at the intersection of these roads Forlì became the focus for minor routes from the mountain valleys and well-cultivated surrounding lands. The site of the city is on terraces ascending gently from the fields and vineyards of the plain to the foothills of the Apennines. It is elliptical in shape, extending from north-east to south-west, and is bisected by the Via Emilia. The remains of the ancient walls outline the limits of the city, except on the north and east where suburbs have grown up near the railway, which runs parallel to the Via Emilia.

History

Once the Roman Forum Livii, Forlì after the fall of the Western Empire (A.D. 476) formed part of the Exarchate of Ravenna and passed to the Papacy by the donation of Charlemagne. Like other cities within the States of the Church, Forlì was engaged in repeated struggles with its papal suzerain in defence of its communal rights. It espoused the Ghibelline cause and thus came into conflict with its Guelf neighbours, notably with Bologna. In 1282 the Ghibelline leader, Guido da Montefeltro, won a great victory there over the French troops sent against the city by Martin IV. For the next two hundred years the fortunes of Forlì were dominated by the native family of Ordellaffi who became lords of the city. In 1359 Cardinal Albornoz gained possession of Forlì, despite the stubborn resistance put up by Francesco Ordellaffi and his intrepid wife Marcia, but the Ordellaffi soon returned to power with the title of Papal Vicars. On the death of Pino Ordellaffi in 1480 Girolamo Riario, nephew of Sixtus IV, became lord of Forlì. In 1488 he was assassinated by the citizens but his widow, Caterina Sforza, succeeded in quelling the revolt and ruled Forlì for her young son until she was driven out by Cesare Borgia in the course of his first campaign in Romagna (1499). After his fall, Forlì came under the direct rule of the Papacy. Forlì produced two men of note during the Risorgimento: Aurelio Saffi, a triumvir in the Roman Republic of 1849, and Pietro Maroncelli, a prisoner in the Spielberg for many years for his part in the Lombard conspiracy of 1821.

Public Buildings and Monuments

The cathedral of Sta. Croce has been largely modernized, but it has a fine Romanesque campanile. The Pinacoteca has a good collection of pictures including the well-known 'Pesta Pepe' (an apothecary's assistant pounding herbs) by Melozzo da Forli (1438-1494), and various works by his pupil, Marco Palmezzano. The half-ruined Rocca di Rivaldino, on the outskirts of the city, was built originally by Alborno. It was enlarged and strengthened in the fifteenth century and recalls the exploits of Caterina Sforza, whose valour in its defence won the admiration of Cesare Borgia.

Industry

Textiles are Forli's main industry. A viscose rayon mill employs 1,000 persons, whilst felt, silk and woollen materials, and sacking and packing canvas are also made. The food industry, unlike that of most other Emilian towns, is relatively unimportant, sugar being the only large-scale product. Other industries include the making of furniture, varnish, and tubes.

Communications

Railway. Forli is on the main double-track and electrified line from Bologna to Ancona. Tramways to Ravenna and Meldola have been replaced by motor-bus services.

Roads. Forli is on road 9 (Via Emilia) from Milan to Rimini and on road 67 from Pisa to Ravenna. The main road to Meldola and along the Bidente valley gives access to roads 67 and 71, both of which cross the Apennines.

Airfield. There is an airfield $2\frac{1}{2}$ miles south-east of the town.

FROSINONE. Altitude 955 feet. Latitude $41^{\circ} 38' N$. Longitude $13^{\circ} 22' E$. Population 75,568. Provincial capital.

Position and Site

The long depression of the Sacco-Liri valley (I, p. 292) extends from north-west to south-east between the limestone Mi. Lepini and Mi. Ausoni on the south-west and the foothills of the Central Apennines on the north-east. This forms the main inland route between Rome and the plain of Campania. Frosinone is on the east side of a widening of the valley, where the F. Cosa breaks through the Apennine foothills to join the Sacco. The site of the town is on the summit of a sandstone spur which rises abruptly for about

600 feet above the east bank of the Cosa. Frosinone is the centre for its fertile basin and it also controls the main route along the Sacco-Liri valley as well as less important routes from Subiaco along the Cosa valley and from the Tyrrhenian coast, through the gap made by the F. Amaseno between the Mi. Lepini and Mi. Ausoni.

History

Frosinone is first heard of as the Volscian city of Frusino, which was conquered by the Romans in 304 B.C. and later became a municipium. From the thirteenth century it was subject to the Church and during the last years of the temporal power it became the chief town of the province of Campagna. After suffering repeated devastations during the Middle Ages, it was ravaged in 1527 by the German infantry who sacked Rome, and again by the Spaniards in 1556. Since 1926 it has been the capital of the province which bears its name.

Public Buildings and Monuments

Of Roman Frosinone only fragmentary walls and traces of an amphitheatre remain. The Cathedral of the Assumption, with its tall campanile, crowns the hill on which the city stands, but it is of no special artistic interest. A sumptuous modern building is the Palazzo del Governo. The chief attraction of Frosinone is the splendid view over the Sacco valley towards the Mi. Lepini.

Industry

Frosinone is an important agricultural market, with some industries, of which the making of bricks and tiles, and boots and shoes are most outstanding.

Communications

Railway. Frosinone has a station on the main inland double-track line from Rome to Naples via Cassino.

Roads. Frosinone is on road 6 (Via Casilina) from Rome to Naples. A main road leads to Subiaco and Arsoli (road 5) and secondary roads to Priverno and Sora.

Airfield. There is an airfield $2\frac{1}{2}$ miles south-east of the town.

GORÍZIA (GÖRZ). Altitude 282 feet. Latitude $45^{\circ} 56' N$. Longitude $13^{\circ} 37' E$. Population 30,265. Provincial capital. Seat of archbishopric. Chamber of Commerce.

Position and Site

Gorizia stands at the junction of the north-south valley of the lower Isonzo and the broad east-west valley of the confluent Vipacco. These two valleys form part of the fertile hilly depression which stretches eastwards from the Northern Plain between the barren limestone plateaux of the Selva di Tarnova on the north and the Carso Tergestino on the south. Within the angle of the river confluence the depression rises to S. Marco (725 ft.), the highest of a group of wooded and cultivated hills, which are the remnants of a former plateau. At the foot of their western slopes, where they are incised by the narrow east-west Val di Rose, Gorizia extends to the left bank of the Isonzo. Here is one of the few stretches along the lower course of the river where crossing-points occur, and this fact, as well as Gorizia's position at the mouths of three valleys, has made it an important route centre. The main road eastwards from the Northern Plain crosses the Isonzo at Gorizia whence main roads lead north along the Isonzo valley to Austria and Yugoslavia, east through the Val di Rose to Yugoslavia, south-east along the Vipacco valley and the Timavo depression to Trieste, and south across the Vipacco valley and over the Carso Tergestino by the Vallone to the Adriatic coast.

Set back from the left bank of the Isonzo, out of reach of flooding, backed by the wooded and cultivated slopes of the S. Marco hills, Gorizia spreads over wide fluvio-glacial terraces dissected by the main river and the north-east to south-west-flowing tributary T. Corno. Although the latter now flows through the city it still encloses on the north the oldest part, which centres round the base of an isolated hill-spur (486 ft.) surmounted by the walled Castello. A stream which emerges from the Val di Rose turns south along the base of S. Marco and flows east of the city to join the Vipacco. Gorizia is thus surrounded on three sides by rivers and sheltered on three sides by mountains. West of the city the mountains of Collio rise steeply beyond the Isonzo and continue northwards to form with the Selva di Tarnova a massive wall broken only by the narrow entrance to the upper Isonzo between M. Sabotino (2,001 ft.) on the west and M. San Gabriele (2,119 ft.) on the east. Three miles to the south rises the Carso Tergestino, leaving the south-west open to the Plain. The braided channels of the Isonzo, however, impede movement between one side and the other.

History

Gorizia is first mentioned in a diploma of the Emperor Otto III, dated A.D. 1001. In the twelfth century it was the residence of the

Counts of Pusteria, the temporal advocates of the Patriarch of Aquileia, who became known as Counts of Görz or Gorizia. For nearly four centuries the counts maintained a sumptuous feudal court in the Castello, which was frequented by a nobility of mixed German and Italian race. In 1307 the upper town, clustering round the Castello, was recognized as a city and the same privileges were conceded to the lower town in 1455. By this time Venice had conquered the greater part of Friuli, and the counts, in return for aid received from the Habsburgs in the defence of Gorizia, recognized them as their successors in default of their own line. On the strength of this treaty the Emperor Maximilian succeeded to the title in 1500, but in 1508 he was forced to yield Gorizia to Venice, after his abortive attempt to force his way through Venetian territory on his coronation journey. He recovered the city in the course of the War of the League of Cambrai, and Gorizia remained Austrian, but for an interval of French occupation (1806-1814), until the War of 1915-1918. It then became the scene of bitter fighting and the city changed hands twice before the Italians finally occupied it in 1918.

Public Buildings and Monuments

The ancient Castello was built by the Counts of Görz, enlarged by the Venetians in 1508, and still further strengthened by the Austrians, who turned the whole city into a fortress. Over the entrance is a figure of the Lion of S. Mark, by the sculptor Giovanni da Campione, placed there in 1509, and restored after the Italians entered in 1918. Close by is the little Gothic church of S. Spirito. The lower city is almost entirely modern. The cathedral of SS. Ilario e Taziano dates from the fourteenth century, but has been rebuilt and suffered considerable damage in the War of 1915-1918. The baroque church of S. Ignazio was founded in 1615 by the Jesuits, whose college was a centre of Italian culture when Gorizia was under Austrian rule.

Industry and Commerce

Gorizia is a centre of the textile industry and an agricultural market for local produce, especially fruit, from the Isonzo valley. The cotton mills, which have recently taken the place of the silk mills, are dependent on the still incomplete Isonzo hydro-electric system for their power. Owing to the development of the textile industry, engineering works in Gorizia now manufacture textile machinery, notably mechanical looms and spinning and throwing machines, as well as agricultural machinery.

The drying and candying of local fruit is the best known of the food industries, though the manufacture of pasta is also important. Pianos and shoes are amongst other goods made in the city. Near by S.A. Cementi Isonzo manufactures Portland cement, cement products, and artificial marble and asbestos.

Communications

Railways. The Stazione Centrale is a junction on the double-track electrified line from Udine to Monfalcone for single-track lines to Pedicolle and Trieste (via Prevacina). The Stazione Montesanto, on the Pedicolle line, is linked by a spur to the Prevacina line to Trieste. The two stations are also connected by an electric tramway.

Roads. Gorizia is on road 55 from Monfalcone to Caporetto and on road 56 from Udine to Aidussina and the Yugoslav frontier. There is also a main road to Palmanova and secondary roads to Tolmino and through S. Daniele del Carso to Trieste.

Airfield. There is an airfield about 2 miles south of the town and east of the Isonzo and the main railway.

GROSSETO. Altitude 33 feet. Latitude $42^{\circ} 46' N$. Longitude $11^{\circ} 8' E$. Population 15,988. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site

Grosseto, the chief town of the Maremma, is situated in the centre of an extensive but sparsely settled coastal plain which, between the rocky headland of Poggio Ballone (2,067 ft.) on the north and the M. dell' Uccellina (1,342 ft.) on the south, spreads inland towards the lower slopes of the Tuscan uplands (M. Leoni, 2,014 ft.). The southern part of the plain is crossed by the F. Ombrone, flowing in broad meanders, and the northern part by the F. Bruna and its tributaries. The area near the F. Bruna is still marshy, but much of the plain has been reclaimed and valuable pastures extend between Grosseto and the pine trees fringing the coast. The city stands on the north bank of the F. Ombrone on the main coastal road from Genoa to Rome. The main route from Florence and Siena enters the plain on the north-east and joins the main road north of Grosseto, which is the focus of routes in the plain. The city is still enclosed by hexagonal walls with six bastions at the points. The modern city has developed with the reclamation of its surrounding lowland and

extends north along both sides of the main road, and less extensively to the south.

History

Grosseto is the chief city of the Tuscan Maremma. Its historical importance dates from the twelfth century when it formed part of the dominion of the Aldobrandeschi, then among the most powerful of the feudal lords of Tuscany. In 1138, the ancient Etruscan city of Roselle having fallen into decay, Pope Innocent II transferred its bishopric to Grosseto. The Aldobrandeschi were soon engaged in a struggle for supremacy with the rising communes, notably with Siena. In 1224 the Sienese took Grosseto by assault and 'for joy of victory held high festival, lighting bonfires and closing the shops'. From that time, save for brief intervals of independence, Grosseto remained under the Sienese yoke, and on the fall of the republic in 1557 passed with other Sienese territories to Cosimo dei Medici, Duke of Florence. First the Medici and then the Habsburg Grand Dukes of Tuscany made strenuous efforts to drain the swamps of the Maremma and to render the district free from fever and more productive. Not, however, until the nineteenth century was genuine improvement effected.

Buildings and Public Monuments

Grosseto, like many medieval Italian towns, was built round a castle and surrounded with brick walls and bastions; these still remain, although they have been much restored. The small Italian Gothic cathedral of white and red marble, founded in 1294, has also suffered from unsatisfactory restoration. The Museo in the Palazzo Comunale contains an interesting collection of antiquities, including a black bowl with the twenty-two letters of the Etruscan alphabet scratched upon it. The ruins of Etruscan Roselle lie some 5 miles from Grosseto.

Industry

Grosseto is essentially a market town, and most of its industries are connected with local products. The food and drink industries are the most notable, especially the manufacture of olive oil, cheeses, pasta, biscuits, and the distilling of liqueur. The marketing of chestnuts is important. Bricks, tiles, furniture, agricultural and textile machinery, and miners' lamps are also made.



PLATE 9. *Florence: the Ponte Vecchio*

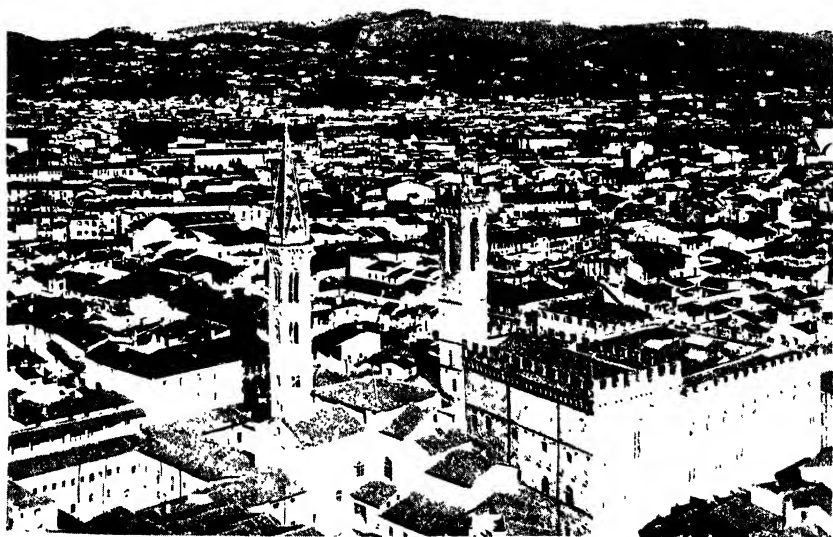


PLATE 10. *Florence: view towards Fiesole*



PLATE 11. *Florence from S. Miniato*



PLATE 12. *Mantua and the Lago di Mezzo*

Communications

Railways. Grosseto is on the main double-track electrified Genoa-Rome line. A single-track line to Siena branches off the main line at Montepescali, $7\frac{1}{2}$ miles north of Grosseto.

Roads. Grosseto is on road 1 (Via Aurelia) to Rome. Road 73 to Siena leaves road 1 about 8 miles north of Grosseto. There are secondary roads to the coast at Marina di Grosseto and Castiglione della Pescaia, and others lead inland into the Tuscan uplands.

Airfield. There is an airfield 2 miles west of the town.

LECCE. Altitude 167 feet. Latitude $40^{\circ} 21' N$. Longitude $18^{\circ} 9' E$. Population 42,622. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site

Lecce stands at the south-east tip of a ridge running north-west to south-east, which rises almost imperceptibly between the Tavoliere di Lecce on the west and the coastal plain of the Salentine peninsula on the east, and is followed by a line of settlements. The position of Lecce has made it a nodal point for routes. The main east coast road from Brindisi passes through Lecce to Otranto on the east coast and to Sta. Maria di Leuca at the tip of the Peninsula. At Lecce other routes diverge to Gallipoli and Taranto, on the west coast. A web of minor routes radiates from the city in most directions into the fields, pastures, and olive groves of the surrounding region, for which it is a marketing and commercial centre.

Lecce, on the eastern slope of the ridge, is triangular in layout and rises gently from the curving base (151 ft.) of the triangle in the coastal plain on the east to its apex (167 ft.) on the west. Within the old city are spacious squares opening out of narrow twisted streets. It was once enclosed by walls, with a fortified castello on the east, but broad streets now mark the line of the walls, and beyond them modern suburbs spread in all directions.

History

Lecce was one of the early Greek colonies which attained to considerable prosperity under the Romans and was known to them as Lupiae. It was taken by the Gothic leader Totila in A.D. 542, and, although it was soon recovered for the Byzantine Emperors, it spent the next five hundred years in unrest, threatened by the Lombards, and ravaged by the Saracens and the Hungarians. The most interesting

period of its history begins with the Norman conquest of 1040 when it fell to Godfrey, one of the sons of Tancred of Hauteville, who became its first Count. The fifth Count of Lecce, Tancred, was elected King of Sicily in 1190, in opposition to the Emperor Henry VI and his Norman wife, but his rival was too strong for him. After Tancred's death his daughter was allowed to succeed to Lecce, and on the failure of her heirs Frederick II invested Manfred with the countship. Charles of Anjou granted Lecce to the house of Brienne, and it remained in their hands until Walter de Brienne, Duke of Athens, and sometime despot of Florence, was killed at the battle of Poitiers (1356). It then passed with his daughter to another French prince, Walter of Enghien, and later again through the female line to the Orsini family, who united it with the principality of Taranto. When Ferdinand of Aragon, King of Naples, seized the Orsini lands in 1463, the independent history of Lecce ended. It was one of the places in southern Italy in which Greek refugees from the Turk settled during the sixteenth and seventeenth centuries.

Public Buildings and Monuments

The centre of civic life is Piazza S. Oronzo, in the heart of the old city, where are the remains of a large Roman amphitheatre, and a statue of St. Orontius, patron of Lecce. Three of the old gates still remain—S. Biagio, Porta Rusca, and Porta Napoli—and beyond the circle of walls in which they stood new streets have sprung up in all directions. Lecce has been called the Florence of the Baroque. The warm yellow sandstone known as *pietra leccese* is well adapted to sculpture, and the chief monuments of the city were either built or restored by native architects and sculptors of the sixteenth and seventeenth centuries. The Cathedral of the Assumption was founded by Godfrey II, Count of Lecce in 1114, but was completely rebuilt by Giuseppe Zimbardo (1659–1670), who is also responsible for the fine campanile. In the Piazza del Duomo are the Palazzo Vescovile, a fifteenth-century building, and the Palazzo del Seminario, with a rich baroque façade. The most important church in the city is Sta. Croce, founded by Walter de Brienne in 1353, rebuilt in the sixteenth century, and restored and raised to the rank of a basilica in the present century. Near it is the Palazzo della Prefettura, another elegant baroque building, which houses the Museo Provinciale. The Castello was built in the thirteenth century and enlarged by the Emperor Charles V (1537–1549), in whose honour the triumphal arch at Porta Napoli was erected (1548). Among several purely baroque churches, that of S.S.

Nicolo e Cataldo, built in 1180 by Count Tancred, retains its magnificent twelfth-century portals and rose window.

Industry and Commerce

Lecce is the main agricultural and commercial centre of the Salentine peninsula. The chief industries are connected with the processing of local products, though printing, glass-making, and the manufacture of papier-mâché figures and statues are of some importance. There is a large olive-oil refinery belonging to S. A. Gaslini, and a tobacco factory, as well as flour mills and pasta factories, whilst fruit is crystallized. Bauxite, phosphate rock, and marble are worked near by.

Communications

Railways. Lecce is the terminus of the main Adriatic coast line from Rimini and Brindisi. Single-track lines run from Lecce to Francavilla Fontana (for Taranto) and Martina Franca (for Bari), Gallipoli, and Gagliano Leuca either via Maglie (whence there is a branch line to Otranto) or via Novoli and Nardo.

Roads. Lecce is on road 16, the Adriatic coast road from Padua to Otranto. Road 7-ter. goes to Taranto and road 101 to Gallipoli. Secondary roads spread out fanwise to serve the surrounding farms and villages.

Airfields. There is an airfield near S. Donato, about 7 miles south-south-west of Lecce, and a smaller one about one mile north of the town.

LUCCA. Altitude 62 feet. Latitude $43^{\circ} 51' N$. Longitude $10^{\circ} 31' E$.

Population 32,896. Provincial capital. Seat of archbishopric. Chamber of Commerce.

Position and Site

The fertile plain of Lucca forms the north-western part of the system of interconnected basins and low hills of the lower Arno region. The Northern Apennines with their southward sweep to Montecarlo rise on the northern and eastern margin of the plain of Lucca and are separated from the Apuan Alps along the north-western margin by the narrow valley of the Serchio. This river, before crossing the plain of Pisa to the sea, curves west through the plain of Lucca along the base of the Apuan Alps into the gorge separating them on the south from the ridge of M. Pisano (2,980 ft.). The ridge forms

the western and south-western wall of the plain of Lucca. The city in its open plain midway between the constriction of the lower Serchio and the entrance to its upper course controls the routes through both. A main route, branching from the west coast route from Genoa to Rome, crosses the slopes of the lower Serchio valley and, beyond Lucca, traverses the low hills north of Montecarlo to Pistoia and Florence. It is crossed in Lucca by another route along the Serchio valley from Modena and the Northern Plain to Pisa and Leghorn. Other routes converge on Lucca from the densely populated and highly cultivated plain for which the city is the marketing, commercial, and industrial centre.

The city is near the south bank of the Serchio where the plain slopes imperceptibly upwards to the Northern Apennines. The main part of the city is roughly oval in shape, and the seventeenth-century walls and arrow-head bastions which enclose it are its most striking feature. They have been planted with trees which form a green margin round the centre of the city. The walls and bastions are still surrounded by the zigzag moat of the Fosso Cunetta and outside them the modern city extends into the plain, especially north to the Serchio and south, round and beyond the railway station.

History

Lucca first emerges on the page of history as the meeting-place between Julius Caesar, Pompey, and Crassus in 56 B.C., when plans were shaped for the government of the Roman Empire by the triumvirs. In the eleventh century it was the foremost city in the marquisate of Tuscany, surpassing in prestige both Florence and Pisa. In 1119 it became a free commune and, apart from intervals of subjection to neighbouring lords and cities, it remained an independent state until 1847. In 1314 it fell into the power of a Ghibelline despot, Uguccione della Faggiuola, lord of Pisa, but emancipated itself from his yoke by electing as its captain-general Castruccio Castracane, one of the greatest military leaders of his age. The latter rose to considerable power in Tuscany, being made Duke of Lucca by the Emperor Louis IV, and the city shared in his triumphs. His death in 1328 brought temporary loss of independence, but in 1369 Lucca purchased a charter of liberties from the Emperor Charles IV which secured to the republic over four hundred years of life. The years 1429-1433 were marked by a war with Florence in which the citizens successfully vindicated their liberty. Their pride in their hard-won freedom is seen in the arms of the Republic which displayed the word

'*Libertas*' *argent* on a bend *or*. A characteristic passage in Hobbes's *Leviathan* observes that "There is written on the turrets of the city of Lucca in great characters, at this day, the word "*Libertas*" yet no man can thence infer that a particular man has more liberty there than in Constantinople'. His verdict is justified in so far that in the seventeenth century the government of the republic was in the hands of a close oligarchy. In 1805 Napoleon made an end of the republic, creating Lucca into a duchy for his sister Elisa and her husband Felice Baciocchi. Their rule ended with Napoleon's fall, but in 1817 the duchy was revived in favour of Maria Louisa of Bourbon, who was given it in compensation for the duchy of Parma. On her death in 1824, she was succeeded by her son Charles Louis and he, in 1847, ceded Lucca to the Grand Duke of Tuscany. In 1860 Lucca by a vote of its citizens, entered the kingdom of Italy.

Public Buildings and Monuments

Lucca occupies an important position in the history of medieval architecture. It has seventy churches, some of which date from the eighth century. The twelfth and thirteenth centuries were the period of greatest building activity, when older churches were enlarged or restored, marble from the Carrara hills providing material for the Lombard craftsmen who worked in the city. The native sculptor, Matteo Civitali (1436-1501), is an artist of high merit whose works are rarely found outside Lucca. Its ancient walls still encircle the city, and a walk on the ramparts with their tree-planted bastions is one of Lucca's chief attractions. The cathedral of S. Martino was rebuilt and consecrated by Pope Alexander II in 1070, while the beautiful marble façade by Guido and Guidetto da Como dates from 1204. Its greatest treasure is the ancient crucifix of cedar wood, known as the *Volto Santo*, which, according to tradition, was made by Nicodemus the Pharisee, assisted by angels. William of Malmesbury bears witness to its fame in medieval England when he records that William Rufus habitually swore by 'the Holy Face of Lucca'. The *Tempietto* in which it is enshrined is the work of Civitali, many of whose masterpieces are in the cathedral. Here too is a lovely early work by Jacopo della Quercia—the tomb of Ilaria del Carretto (d. 1405), the young wife of Paolo Guinigi, the leading citizen of Lucca. Beside the Church of S. Frediano rises a noble campanile and within lies the embalmed body of Sta. Zita, once a holy servant-girl of Lucca and now the patron saint of housemaids. S. Michele is another splendid church, its façade by Guidetto da Como being crowned by an immense bronze

statue of St. Michael. The Pinacoteca Comunale has a good collection of pictures and sculpture.

Industry

The city is an important centre for the production of high-class olive oil, which is exported throughout the world. Flour milling and the manufacture of pasta are other major food industries, whilst wine is a considerable local product. Besides being a collecting centre of locally produced silk cocoons, Lucca has silk and woollen mills producing textiles and cotton mills manufacturing sewing cotton, one of which belongs to Cucirini Cantoni Coats. There is also a jute spinning and weaving mill, and a tobacco factory.

Communications

Railways. Lucca is the converging point of five single-track lines running from Pistoia via Montecatini, Pontedera, Pisa, Viareggio, and Castelnuovo via Bagni di Lucca.

Tramways. An electric tram runs from Lucca to Pescia.

Roads. The autostrada from the west coast road 1 to Florence passes close to Lucca on the south. Road 12 from Modena to Pisa goes through Lucca. Other main roads lead to Viareggio, Camaiore, Castelnuovo, Pistoia and Florence, Empoli, and Pontedera.

Airfield. There is an airfield 4 miles east of the town.

MACERATA. Altitude 1,020 feet. Latitude $43^{\circ} 18' N$. Longitude $13^{\circ} 28' E$. Population 14,460. Provincial capital. Seat of bishopric. University. Chamber of Commerce.

Position and Site

Macerata stands on the crest of a ridge extending to the Adriatic coast from the main chain of the Apennines and rising between the parallel valleys of the Potenza and Chienti rivers on the north and south. Although Macerata is on only one main route it controls important road junctions in the valleys below. It has thus become a centre for roads crossing the northern part of the Adriatic Coastland from the coast inland and from north to south.

The city extends from west to east along the ridge. Successive stages in its development are marked by its layout. The ancient nucleus clings to steep slopes surrounding the cathedral at the eastern and highest end. Semicircular lines of streets surround the Piazza Vittorio Emanuele (1,050 ft.) at the centre and mark the medieval city

limits, which were enclosed in the fourteenth century by walls and bastions, roughly rectangular in outline. The city has expanded beyond the walls in three arms: Borgo Cavour (c. 1,017 ft.) stretches west, Borgo S. Giovanni or Cairoli slopes south from the Porta Mercato (968 ft.) towards the railway station (843 ft.), and Borgo S. Giuliano (833 ft.) stretches north-west, below the cathedral.

History

The Commune of Macerata was founded in 1138 by the union of the two villages of Poggio S. Giuliano and Castello di Macerata. In opposition to its overlord, the Bishop of Fermo, it was an active champion of the Ghibelline cause. In 1290 Pope Nicholas IV founded the university, which is still in existence. From the fourteenth to the sixteenth century Macerata was the seat of the papal government of the Marches of Ancona and the residence of the Legate. When Francesco Sforza made himself master of the province in 1433 the ecclesiastical government was overthrown and only restored in 1445. The last Legate to reside there was Cardinal Pio Carlo Emanuele, a cadet of the house of Savoy, and to him the present layout of the city is largely due.

Public Buildings and Monuments

The architecture of Macerata is predominately baroque, some of the walls built by Alborno in the fourteenth century and the graceful Loggia dei Mercanti by Cassiano da Fabriano being the principal monuments of earlier ages. This last is an interesting example of the assimilation of the Tuscan style by a native architect. The Palazzo della Prefettura, the former residence of the Legates, is a fine specimen of sixteenth-century work, as is the Bramantesque church of Sta. Maria delle Vergini outside the city. The cathedral (1771-1790) replaced a fifteenth-century building of which only the campanile remains. The Sferisterio, or tennis-court, is a handsome neo-classical building, and the Aula Magna of the university contains modern frescoes depicting its foundation by Nicholas IV.

Industry and Commerce

Macerata is a collecting centre for agricultural products, such as olives, fruit, cereals, silkworm eggs, wine, and beer. Olive oil, pasta, tiles, artistic furniture, brass musical instruments, harmonicas, and tower clocks are manufactured, whilst there are small cotton mills. Printing has been a local industry since the Renaissance.

Communications

Railways. Macerata is on the single-track line from Civitanova Marche (a station on the main Adriatic coast railway) to Castelraimondo and Albacina, on the main Ancona-Rome line.

Roads. Macerata is on road 77 from Porto Recanati on the main Adriatic coast road to Foligno. This road is followed for a short distance on either side of Macerata by the main inland road which runs parallel with the Adriatic coast from Iesi in the north to Guardiaferle in the south.

Airfield. There is a landing-ground about 5 miles south-west of the town on the north side of Chienti valley.

MANTUA (Mántova). Altitude 66 feet. Latitude $45^{\circ} 9'$ N. Longitude $10^{\circ} 48'$ E. Population 36,489. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site (Plate 12)

Mantua stands on the right bank of the F. Mincio where it widens in a broad meander to form a lake. On all sides extends the fertile, cultivated plain, criss-crossed with drainage channels and closely dotted with settlements. Situated at the point where the ancient east-west trade route from Venice through the centre of the Plain is crossed by the main route from Spezia and Parma, on the Via Emilia, to Verona and the Alps, the city developed in early times and is now an important route centre and a market for the surrounding region. The strong defensive site of Mantua aided the prosperous growth of the city by maintaining its independence against powerful rivals and gave it strategic importance.

The city covers a broad wedge surrounded on the west, north, and east by the lake and rises on a low terrace directly from the water's edge. The river is liable to flood the low surrounding meadows, and as early as the twelfth century two causeways, which divide the lake into three parts, were built to control it. The south-north Ponte dei Molini carries the main route north to Verona and separates Lago Superiore, the western part of the lake, from Lago di Mezzo, which curves north-east of the city. The west-east Ponte S. Giorgio, carrying the main road eastwards, separates Lago di Mezzo from Lago Inferiore, which narrows at the south-eastern corner of the city into the normal river course. The far ends of each bridge were fortified and became the main outer gates of the city on the north and east. On the southern side Mantua

has been defended by successive lines of walls and water. The earliest defence line is marked by the Rio, which flows across the city from the Lago Superiore into the Porto Catena basin before entering Lago Inferiore. The southward expansion of the city is marked by the canal of Fosso Scaricatore with its accompanying line of walls. A former channel of the Mincio, now in parts marshy and replaced by the Fosse Paiola and the Valli dei Topi, almost completes the circle of water round the city.

History

Mantua was an Etruscan city which, according to tradition derives its name from the Etruscan deity, Manto. Such importance as it possessed under the Romans is due almost entirely to Virgil, who was born at the village of Pietola, close to the city and wrote of Mantua as his birthplace. Dante's description in the *Purgatorio* of the meeting between Virgil and another Mantuan poet, the thirteenth-century troubador Sordello, is a characteristic example of Italian civic patriotism. Sordello greets Virgil with the words 'O Mantuan, I am Sordello of thy city', and the fellow-citizens embrace. In the Middle Ages Mantua was a fief of the empire granted to the house of Tuscany. The citizens took advantage of the quarrel between Henry IV and the Countess Matilda to win a large measure of independence, and not long after her death (1115) Mantua was recognized as a free commune. It took part in the struggle of the Lombard communes for their liberties, and in 1248 withstood a siege by Ezzelino da Romano. In 1273 the Mantuans elected a leading citizen, Pinamonte Bonacolsi, as Captain of the People, and in so doing established the rule of a despot. The Bonacolsi maintained their power until 1328 when they were overthrown in favour of Luigi Gonzaga, to whose lordship and that of his descendants Mantua owed its chief importance. The position of the city made it a buffer-state between Milan and Venice. In 1397 Gian Galeazzo Visconti besieged Mantua, and in the war of 1438-1441 between Milan and Venice the Venetians attacked the city in order to secure a much needed line of communication with their westernmost conquests. In spite of the dangers to which Mantua was exposed, the military and diplomatic skill of her Gonzaga lords preserved her independence and brought her renown. The Gonzaga were nearly all professional soldiers, and the wealth which they acquired as *condottieri* was spent on the patronage of art and letters. Gian Francesco (1407-1444) brought the humanist educator,

Vittorino da Feltre, to Mantua, where he opened his famous school. Lodovico (1444-1478) was Vittorino's pupil, and made Andrea Mantegna his court painter. His grandson, Francesco (1484-1519), married Isabella d'Este, whose literary and artistic tastes made the court of Mantua celebrated throughout Italy. The Gonzaga owed much to their friendly relations with the Empire. Sigismund bestowed on Gian Francesco the title of Marquis (1433), and both Lodovico and his son married Germans. Charles V showed signal favour to the family, creating Federico II a Duke in 1530, and making his younger brother Ferrante the imperial lieutenant in Milan. The house of Gonzaga reached the climax of its prosperity in 1536 when Federico II succeeded to Monferrato in right of his wife. In 1627 the heir to Mantua and Monferrato was Carlo Gonzaga, Duke of Nevers, and the refusal of the Emperor to admit his claim led to the Mantuan Succession War. A French army came to the duke's support, but Mantua was besieged and sacked by the Austrians in 1630, receiving injuries from which the city never recovered. Although the Gonzaga were restored, they were at the mercy of the great European Powers, and in 1707 Mantua was annexed to Austria. In 1797 Napoleon took possession of the city after a long siege and Mantua was incorporated first in the Cisalpine Republic and then in Napoleon's Italian Kingdom. Restored to Austria in 1814, Mantua became the south-western bastion of the celebrated Quadrilateral (II, p. 122), and remained in Austrian hands until 1866, when, together with Venetia, it entered the kingdom of Italy.

Public Buildings and Monuments

All other monuments in Mantua are overshadowed by the Reggia, or Ducal Palace, a vast pile of buildings which includes the thirteenth-century Magna Domus of the Bonacolsi, the Castello of S. Giorgio, begun in 1390, the extensions made by Gonzaga princes in the fifteenth, sixteenth, and seventeenth centuries, and finally, the eighteenth-century additions of the Empress Maria Theresa. Of peculiar artistic interest are the frescoes completed by Mantegna in 1474 in a room in the Castello known as the Sala degli Sposi; these represent scenes in the life of Lodovico Gonzaga and his family. On the ground floor of the Corte Vecchia are the set of apartments to which Isabella d'Este retired in her widowhood, bringing with her from her former rooms in the Castello, her most cherished works of art. The walls are decorated with her favourite devices and mottoes, and the suite includes an enclosed garden surrounded by Ionic

columns with a frieze bearing her name and the date 1522. Other parts of the Reggia include magnificent wall and ceiling decorations executed by Giulio Romano for Federico II, and the miniature apartments made at the end of the sixteenth century for the dwarfs, who had long been a feature of the court. Giulio Romano was brought from Rome in 1524 to build the Palazzo del Tè, on the outskirts of the city, as a summer residence for the ruling family. Here one of the most remarkable rooms is the Sala dei Cavalli, decorated with portraits of the horses, for which the stables of the Gonzaga were famous. Little of the medieval cathedral of SS. Pietro e Paolo survived the fire of 1545, and the present building was planned by Giulio Romano; the Romanesque campanile remains. The most interesting church in Mantua is S. Andrea built from the design of Leon Battista Alberti between 1472 and 1494. It contains the tomb of Mantegna, who died here in 1506, after many years spent as the principal painter of the court. North of the city is the ancient Ponte dei Molini separating the Lago Superiore from the Lago di Mezzo; it was begun by the commune in 1198, and rebuilt more than once, the Cittadella di Porto at the northern end of the bridge being added in the fifteenth century by the fourth Gonzaga Marquis. The walls and bastions of the fortress are reinforced by zigzag water defences.

Industry

Mantua is an agricultural market, and has a wide range of industries. Locally produced silk cocoons and worms, and butter and cheese are marketed, whilst food-processing establishments include flour and rice mills, sugar beet, sausage, and pasta factories. The large paper mill belonging to Cartiere Borgo is very important, whilst the iron foundries and factories making bicycles, agricultural implements, and furniture are also notable. Finally there are brick and tile works, and workshops for the manufacture of brooms, brushes, and toys.

Communications

Railways. Mantua is on single-track lines from Pavia to Moncelice and from Verona to Modena (double track between Verona and Dossobuono). A single-track line from Mantua to Ferrara branches from the latter at Suzzara. A light railway runs from Mantua to Peschiera.

Tramways. A steam tramway runs from Mantua to Brescia. Electric tramways serve the city, and also run to the sanctuary of

Le Grazie, Montanara and Ospedale Pompilio. The steam-trams to Asola, Ostiglia and Viadana have been superseded by motor-buses.

Roads. Mantua is on road 10 from Turin to Monseice, and on road 62 from Verona to Parma and the west coast. Road 63 for Reggio branches from road 62 at Guastalla. Other main roads lead to Brescia, Ferrara, and Modena, whilst the road for Peschiera branches from road 62 near Roverbella.

Waterways. The Mincio is navigable for 600-ton barges up to Mantua.

Airfield. There is a landing-ground one mile south of the city between the main road on the west and the Mincio on the east. Formerly there was a seaplane landing-place on Lago Superiore.

MATERA. Altitude 1,316 feet. Latitude $40^{\circ} 39' N$. Longitude $16^{\circ} 38' E$.

Population 21,762. Provincial capital. Seat of archbishopric.

Position and Site

Matera is near the north-western end of a limestone ridge which rises about 300 feet above the general level of the surrounding sands and clays of the Taranto-Tavoliere corridor. This ridge is cleft from north to south at Matera by the remarkable canyon of the Gravina di Matera above the brink of which, on the west, rises the final spur of the ridge, crowned by the ruined Castello. Most of the town spreads over the lower slopes of the Castello hill immediately above the canyon. The main street conforms to the general direction of the canyon, but much of the town stands on a spur jutting into it. Some of the older parts, however, in the districts of Sasso Barisano and Sasso Caveoso, climb up the side of the canyon where houses and churches become intermingled with jagged pillars of bare limestone, and rock dwellings abound. In marked contrast, the modern part of the town extends over more gentle slopes north of the main street. The defensive value of this site is remarkable and advantage has been taken of it since Palaeolithic times. Moreover, the situation of the town is of considerable strategic significance. Matera stands almost in the centre of the Taranto-Tavoliere corridor with the Murge rising steeply on the north-east and the Lucanian Apennines on the south-west. It controls routes from the highlands on either side as well as others along the corridor between the gulf of Taranto on the south-east and the Tavoliere di Puglia on the north-west. Most notable of these is the road to Castellaneta beside the limestone ridge.

History

Matera is probably of Greek origin. It was rebuilt by the Roman consul Q. C. Metellus, and occupied by both Pyrrhus and Hannibal. Goths, Byzantines, Lombards, Franks, and Saracens in turn took possession of it. After the Saracens had completely destroyed it in 994, it rose again under the Byzantines. In 1061 it was conquered by the Normans, and was held by Robert, Count of Montescaglioso. Ferdinand II of Aragon invested Gian Carlo Tramontano with Matera, but in 1514 the citizens rose against him and killed him. It then passed to the Orsini from whom the citizens bought their liberty. In the seventeenth century Matera became the capital of the Basilicata (Lucania) and remained so until Joseph Bonaparte raised Potenza to the first place, in 1806.

Public Buildings and Monuments

Matera has an interesting cathedral dating from the thirteenth century; its rich façade has a sculptured group of the Madonna and Child, with saints, over the central doorway. The Castello, with its three towers, was built by the tyrant of Matera, Tramontano. The Museo Ridola, in the former convent of Sta. Chiara, is mainly archaeological. One of the most interesting features of Matera are the houses hollowed out of the rock. Two churches, those of S. Pietro Barisano and Sta. Maria de Istri, are also built in caverns. Matera is a very picturesque city with steep and winding streets and houses, dating mostly from the seventeenth century, adorned with loggias and balconies.

Industry

Matera is an important agricultural centre for corn, timber, and olive oil. The main industries are connected with processing local products and include the making of pasta, cheese, and wine, the refining of olive oil, and the sawing and planing of timber. The manufacture of bricks, tiles, and pottery is also important.

Communications

Railway. Matera is on the narrow-gauge railway from Bari to Montalbano Ionico.

Roads. Matera is near the junction of road 7 from Potenza to Taranto with road 99 from Altamura. Secondary roads lead to Gravina di Puglia, Montescaglioso and Metaponto, Ginosa, and Santeramo in Colle.

MERANO (Meran). Altitude 1,063 feet. Latitude $46^{\circ} 41'$ N. Longitude $11^{\circ} 9'$ E. Population 22,575. Provincial capital.

Position and Site

Merano is at the north end of the Merano basin, the broad and deep section of the Adige trough which extends south-south-east almost direct to Bolzano. Drainage channels criss-cross the floor of this trough, and its flanks, broken only by small tributary valleys, rise almost sheer to over 5,000 feet. At Merano the Adige valley turns abruptly westwards and narrows to the constriction at Tel, beyond which it opens out again to the Val Venosta. Immediately below this bend the Adige valley is joined on the north by the narrower Passirio valley. Merano, on the broad dejection-cone at the mouth of the Passirio valley, controls not only this valley but also the Val Venosta and the Merano basin (I, Plate 22; III, Plate 20), and the important routes along them between the Northern Plain, Switzerland, and Austria.

The oldest part of Merano is built on the right bank of the F. Passirio and is sheltered on the north by the south-eastern spur of M. Mut (7,520 ft.), which rises directly behind the town. The modern town, comprising the old districts of Maia Bassa and Maia Alta, extends over the low terraces of the left bank of the Passirio and up the cultivated and wooded lower slopes, which form the western edge of the Bolzano plateau and mark the southern limits of the Mi. Sarentini. West of Merano across the Adige rises the massive bastion of Dosso dei Larici (5,984 ft.) round which the Adige flows from the Val Venosta through the constriction at Tel into the Merano basin.

History

There is no mention of Merano in the classical era, although the Romans had a customs station at Maia, now a suburb on the opposite bank of the Passirio. The name first occurs in a document of A.D. 857, and later Merano was held as a fief of the Bishop of Trento by the Counts of Venosta, who in the twelfth century assumed the title of Counts of Tirol. As the capital of Tirol, Merano became a place of some importance and in 1343 the marriage of Margaret Maultasch, the last countess of her line, to Louis of Wittelsbach, the son of the Emperor Louis IV was celebrated here. Before her death Margaret ceded Tirol to the Habsburgs, who made Innsbruck their capital, and Merano lost its prestige. It remained insignificant until its development in the nineteenth century as a health resort. Its inhabitants were almost entirely German speaking when, in 1918,

Italian forces occupied it in accordance with the terms of the Treaty of London (1915). Since 1923 it has formed part of Venezia Tridentina.

Public Buildings and Monuments

The old city is traversed by the Lauben Gasse, now known as Via dei Portici from the arcades on both sides of it. The cathedral is a Gothic building (1367) with a curious embattled façade, and a tall campanile. Behind the cathedral is an octagonal baptistery with a crypt. The Castello built by Sigismund of Habsburg in the fifteenth century has an unspoiled exterior but has been renovated inside. There is a small Museo Civico, and numerous promenades, winter-gardens and sanatoria. In the neighbourhood is the Castel Tirol, the castle from which the Counts of Tirol took their title; built in the twelfth century, it has a fine hall and chapel.

Industry.

The town is primarily an agricultural market and tourist centre, and its industries are mostly on a small scale, except for the important synthetic ammonia plant which is the third largest in Italy. There are, however, small sawmills, furniture workshops, and workshops where gold and silver trinkets are made.

Communications

Railway. Merano is on the single-track line from Bolzano to Malles Venosta; the section between Bolzano and Merano is electrified.

Tramways. Electric trams cross the city from the station to the suburb of Maia Alta, and run to Lana and Postal, and to Foresta di Marniga. There is an aerial railway to Avelengo.

Roads. Merano is on road 38 from Bolzano up the Adige valley and thence to Sondrio and Lake Como. Road 44 goes from Merano to Vipiteno where it joins road 12 for the Brenner pass. There is a secondary road to Lana and Valpurga d'Ultima.

MILAN (Milano). Altitude 400 feet. Latitude $45^{\circ} 27' N$. Longitude $9^{\circ} 10' E$. Population 1,068,079. Provincial capital. Seat of archbishopric. University. Chamber of Commerce and headquarters of British Chamber of Commerce for Italy. Stock Exchange. British Consul-General.

Position and Site (Fig. 4)

Milan, the 'Mediolanum' or centre point of Roman times, lies towards the middle of the Northern Plain midway between the fringe of the Alps on the north and the Po on the south, with the Ticino and Adda rivers, forming defensible lines from the Alps to the Po, at equal distances west and east of the city. As the crossing-point of lines of communications between central Europe and the Mediterranean, western Europe and the Adriatic, Milan has always been of great strategic importance and a centre for commerce and culture. The route from the Western Alps through Turin to Milan, and thence along the northern edge of the plain to Vicenza and Venice, is crossed by the route from Lake Maggiore to Piacenza, Bologna, and the Adriatic coast, and routes from the southern arms of Lake Como to Pavia and Genoa. Many other routes converge from the densely populated industrial area in the morainic hills of lower Brianza on the north and the surrounding plain. Its position has made Milan the road, railway, and industrial capital of Italy, and it is also a great marketing centre for the fertile, well-watered agricultural region surrounding it.

The site of the city, on ground sloping gently towards the Po, is bounded by two of its tributaries, on the west by the F. Olona and on the east by the F. Lambro, although the modern city spreads beyond both rivers. The site of the ancient Roman settlement is around the Piazza del Duomo in the centre of the modern city. Here the great routeways from all directions intersect and have determined the layout of the city. All the main streets radiate from the centre. Three concentric lines of streets intersect the main streets and indicate different stages in the development of Milan. The innermost of these lines represents the site of the Roman walls; the next represents the line of the ancient 'Navigli', a system of canals formerly encircling the city for the combined purpose of defence and prevention of flooding of the numerous streams which here cross the plain; the third represents the line of the bastions built by the Spaniards in the sixteenth century. The area between the lines is criss-crossed by a dense network of smaller narrow streets sometimes opening into parks and squares. The more modern city still follows the pattern determined by these three lines and now incorporates a wide surrounding fringe of industrial suburbs, interspersed with open spaces for race-courses and public parks. The large number of lakes in the parks, a seaplane landing-place at one of the airports, and waterways in and around the city, indicate the well-watered nature of the region.

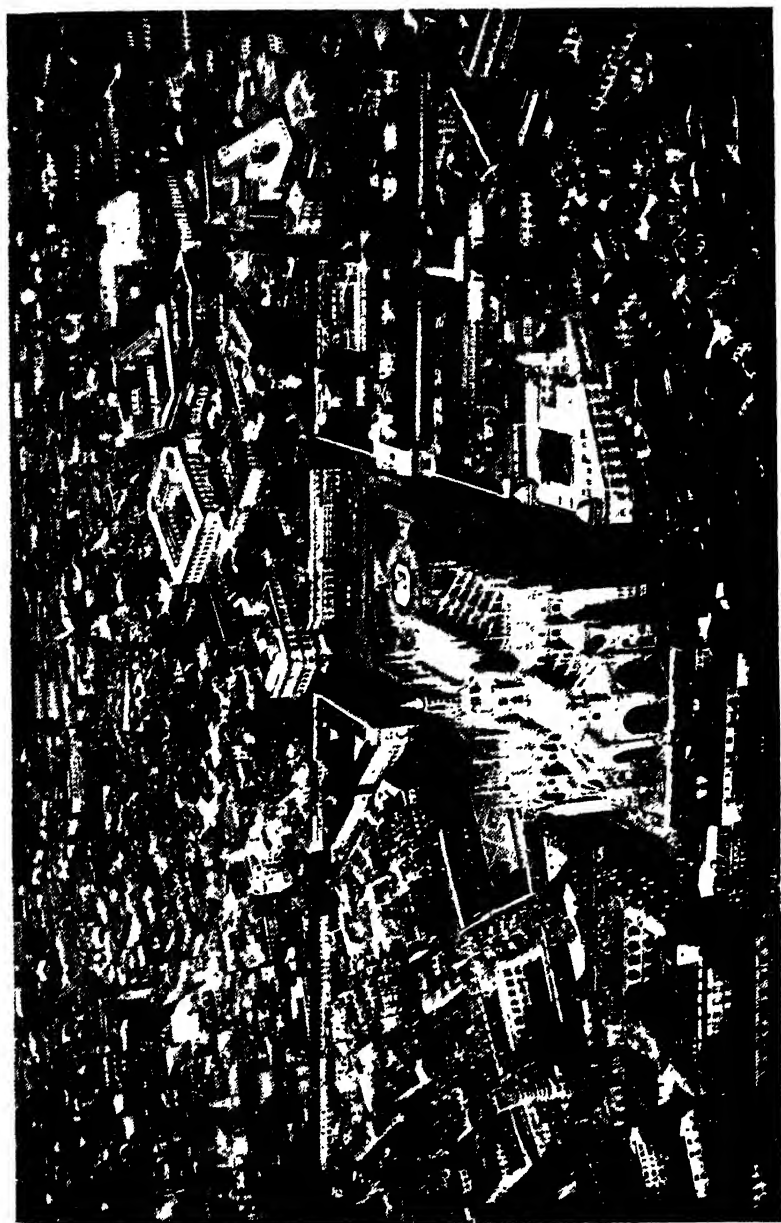


PLATE 13. *Milan and its cathedral*



PLATE 14. *Pisa: the Campo Santo with the Baptistry, the Cathedral, and the Tower*



PLATE 15. *Pavia: the covered bridge over the Ticino*

History

Milan has been a place of importance from very early times. Its position in the centre of a fertile plain, lying at the foot of some of the chief Alpine passes, gave it control over the gateway into Italy, facilitated the extension of its authority over neighbouring cities, and afforded opportunities for widespread agricultural and industrial development. The city was the capital of the Gallic tribe of Insubri when it was captured by the Romans in 222 B.C. and named Mediolanum. Under the Empire it attained a high level of prosperity; from here in A.D. 313 Constantine issued his famous edict of toleration which freed the Christian Church from persecution and enabled it to grow in power. The influence wielded by churchmen at this time is seen in the career of St. Ambrose, Bishop of Milan 374-397. Milan in his day was the seat of the Western Empire, and the two young Emperors Valentinian and Gratian were tools in his hands. He refused to permit unorthodox Arian worship in churches within his jurisdiction, and forced the Emperor Theodosius to do penance for his crimes of violence. Such was the mark which he set on the city that Ambrosian became a synonym for Milanese.

Milan suffered severely from successive barbarian invasions, in the course of which the Roman city was almost completely destroyed. It rose again after Charlemagne's victory over the Lombards, and in the tenth century both civil and ecclesiastical authority were concentrated in the hands of its archbishops. The authority of the archbishops, representing as they did the noble faction in the city, threw the democrats into the arms of the party of church reform, and the religious controversy of the eleventh century became in Milan a civic struggle. From it emerged the free commune which was to play the leading part in the struggle for civic autonomy against the Hohenstaufen Emperors. Twice over Milan was besieged by Frederick Barbarossa, and after the second siege (1162) the city was destroyed. It was promptly rebuilt with the aid of other members of the Lombard League, and the battle of Legnano (1176), followed by the Peace of Constance, marked the triumph of the communes.

Traces of the original Roman city have been found within the square formed by Via Orefici, Via Torino, Via Maurilio, and Via Bocchetto, but already in the fourth century there was another and wider circle of walls and the city possessed six gates. These walls, which were rebuilt after 1162, corresponded roughly to the existing Naviglio Interno, and the old gateway of Porta Nuova can still be seen in the Piazza Cavour. The citizens also embarked on the

colossal enterprise of bringing the waters of the Ticino to Milan by the construction of the Naviglio Grande, a work which was continued by the Visconti. Suburbs continued to spring up during the next few centuries until these were enclosed within yet another circle of walls by Ferrante Gonzaga, who became Viceroy of Milan for Charles V in 1547. Although the fortifications have disappeared, their line is preserved by the existing Porte.

While Milan advanced in power and prosperity it continued to be torn by faction. In the thirteenth century rival noble families, the Guelph della Torre and the Ghibelline Visconti, fought for supremacy, each striving to make Milan the headquarters of their party in Lombardy. The citizens, in the interests of peace and order, elected either a Della Torre or a Visconti as their Captain, and the two families enjoyed alternating periods of power until the coming of the Emperor Henry VII ensured the triumph of the Visconti (1311). The zenith of their fortunes was reached under Gian Galeazzo (1378-1402). Not only the whole Lombard plain but the greater part of Italy acknowledged his supremacy (II, Fig. 11). He received imperial investiture as Duke of Milan, while his power and the marriage alliances which he contracted with the French royal house were an effective curb to French intervention in Italy. At home he carried out extensive administrative reforms, including the institution of a regular postal service, and developed industry and commerce. Milan became famous for the manufacture of arms and, in the fifteenth century, a centre of the silk industry. On the death of his son without male heirs (1447) an attempt to restore the rule of the commune in the Ambrosian Republic was a miserable failure, and the citizens accepted Francesco Sforza, the husband of Bianca Visconti, as their Duke (1450). Both at home and abroad the Sforza Dukes carried on the Visconti tradition, increasing the prestige and unity of their dominions, and making Milan a bulwark against foreign invaders. They continued the work on the cathedral, begun under their predecessors, and built the Castello Sforzesco, which under Lodovico Sforza became the centre of the most brilliant court in Italy, with Leonardo da Vinci as its presiding genius. In 1494 Lodovico reversed the policy of his house by inviting Charles VIII of France to Italy. In so doing he compassed his own ruin, and made Milan the cockpit of European armies. Louis XII of France, whose grandmother was a Visconti, ruled Milan for twelve years (1500-1512). He was driven out by the Swiss, who set up a Sforza as their puppet Duke, until they in their turn were overthrown by Francis I at the

battle of Marignano (1515). In 1521 the Emperor Charles V conquered Milan, and Francis I, attempting to recover it, was defeated and taken prisoner at the battle of Pavia (1525). Charles bestowed the duchy on Francesco Sforza II and married him to his niece, as part of his plan to control Italy by a Habsburg family system, but Francesco died without heirs (1535) and Milan passed to Spain. It was held under viceroys until the duchy was transferred from Spain to Austria by the Treaty of Utrecht (A.D. 1713).

During the reigns of the Emperor Charles VI and Maria Theresa, Milan experienced Austrian government at its best. Except for a viceroy and a few officials, it was ruled by Italians and became once more rich and prosperous. Joseph II, however, suppressed the Senate and ruled Lombardy as a province of the Empire with Austrian officials. In Milan there was growing discontent with the centralized form of government and the exclusion of Italians from all important positions. Bonaparte entered Milan in 1796 and made it the capital of his Cisalpine Republic (II, Fig. 14). In 1805 he was crowned in the cathedral, with the ancient iron crown, as King of Italy, appointing Eugène Beauharnais as his Viceroy. Although the people of Milan had little military tradition and neither the Spanish nor the Austrian governments made extensive use of their manhood for military purposes, they remained sturdy in their defence of civic independence. After the return of the Austrians in 1814 Milan became a centre of resistance to foreign rule, and in 1848 the rising known as the 'Five Days' opened the first war of Italian independence. The Austrians were driven from Milan, but Charles Albert's quixotic attempt to defend the city after his defeat at Custoza ended in failure. Milan was condemned to her worst period of foreign oppression under the military despotism of General Radetsky, an oppression which only ended with the defeat of the Austrians at Magenta in 1859. From her entry into the kingdom of Italy Milan rapidly became the financial and industrial centre of the nation. Her people are distinguished by their keen business sense and by a determination to defend their rights which has made her industrial classes the bulwark of the Socialist movement.

Public Buildings and Monuments (Plate 13)

The centre of Milan is dominated by the famous cathedral. Begun in 1386, it is in the main a Gothic building, but work on it continued intermittently until the year 1813. The exterior, with its 135 pinnacles and 2,300 statues in marble, is over-elaborate but nevertheless

impressive. The services of the cathedral are those of the ancient Ambrosian rite, which differs in several particulars from the modern Roman use. On the south side of the Piazza del Duomo is the Palazzo Reale, an eighteenth-century building which occupies the site of the old communal palace and the residence of the Visconti Dukes. In 1918 it was made over to the city by the Crown and is now a museum. Opposite it is the Galleria Vittorio Emanuele, a glass-roofed arcade, cruciform in shape, which is the chief rendezvous of the city, and contains some of the best cafés, restaurants, and shops. At the north end of the Galleria is the Piazza della Scala with the celebrated opera house, the seventeenth-century Municipio (Palazzo Marino), and a statue of Leonardo da Vinci in the centre of the square.

Of the numerous churches in Milan the most interesting is S. Ambrogio (II, Plate 8). Founded by St. Ambrose in the fourth century in basilica form, and rebuilt and added to in 789-859 and 1098-1128, it is of unique importance in the history of architecture. S. Eustorgio presents a good example of a Lombard basilica dating from the twelfth century, and contains, in the Portinari Chapel, a gem of the Renaissance. The graceful little church of S. Satiro is Bramante's work, as is the greater part of Sta. Maria delle Grazie. In the convent refectory of this last-named church is Leonardo's fresco of the Cenacolo or Last Supper. The Castello Sforzesco was begun by Francesco Sforza on the site of the old fortress of Porta Giovia which was destroyed under the Ambrosian Republic (1447-1450). It grew to its full splendour under Duke Ludovico, Bramante, and Leonardo, but after the French conquest it suffered both from war and neglect. Its condition at the end of the nineteenth century was such that it was proposed to pull it down; Luca Beltrami, however, saved it from destruction and carried out a careful restoration in which much of the original decoration was reproduced. It is now a vast museum in which every phase of Milanese history is represented. The other chief monument of the Sforza period is the Ospedale Maggiore, planned for Francesco by the Florentine architect Filarete, with characteristic Lombard terra-cotta decoration. Greatly enlarged, it is still the principal hospital in Milan. The Palazzo di Brera contains one of the leading collections of pictures in Italy. In the Museo Poldi-Pezzoli is a smaller but very choice art-collection made by a cultivated citizen of that name and bequeathed by him to Milan (1879). The Biblioteca Ambrosiana, founded by Cardinal Federico Borromeo in 1609, has besides its

priceless library a good collection of pictures. The most modern of Milan's monuments is the Central Railway Station, a typical example of Fascist architecture which, however, has been largely destroyed by bombing during the War of 1940-1945.

Industry and Commerce

Milan is the financial, commercial, and industrial capital of Italy and the headquarters of many of the large industrial combines, such as Montecatini, Breda, and Redaelli Guiseppe e Fratello. It is also an important manufacturing city surrounded by a rich industrial and agricultural region, for which it is the commercial and marketing centre. The towns immediately to the north-west and north-east are notable for their textile and engineering industries, whilst the lesser towns still farther north on the Brianza hills are textile and furniture centres. To the south, the Po plain is intensively cultivated and is one of the most fertile regions of all Italy.

The textile and engineering industries are of outstanding importance. Silk is the most important of the textiles, as Milan is the commercial centre for the European silk trade as well as the principal Italian seat of the silk-reeling industry. Over fifty mills are engaged in this branch of the industry, the most important belonging to the S.A. per la Filatura e Torcitura in Italia and La Seta. The spinning of silk waste is also notable. The cotton industry is mainly carried on in the towns to the north-west, though in Milan itself there are over one hundred spinning and weaving mills, of which the two largest belong to the Cotonificio Benigno Crespi and Cotonificio Bresciana Ottolini. Cotton bleaching and the manufacture of sewing thread, mainly by Cantoni Coats, are important, and Milan is a centre of the rayon industry. It is the headquarters of the 'Italrayon' association, which controls the foreign marketing of rayon, and also of the Linificio e Canapificio Nazionale, the principal manufacturers of flax and hemp. A very large number of firms are engaged in the clothing industry, which is of the greatest importance. Amongst the most notable of their products are underwear, garters, suspenders, corsets, ties, handkerchiefs, cotton, and particularly silk stockings (including the type known as Milanese), knitwear, ribbons, laces, veils, haberdashery, embroidery, ready-made outer garments, hats, and gloves.

Although its metallurgical industry is only of moderate importance, Milan is one of the principal Italian centres of the general engineering industry, with more than a hundred firms of various sizes. These

make turbines, diesel engines, motor-cars, lorries, locomotives, motor-cycles, aircraft, railway equipment, hydro-electric pumps, electric cables, optical and precision instruments, machine tools and industrial plant of all kinds, agricultural machinery, and all types of wireless, telephone, and electrical equipment, including accumulators. The chief engineering firms are S.A. Alfa Romeo and S.A. Edouardo Bianchi (motor vehicles and aircraft), Caproni (aircraft), and Osram (electric lamps).

Milan is the principal centre in the country of the chemical, leather, and rubber industries. Some of the most notable chemical firms have works here, including Montecatini, l'Appula, and the S.A. Fabbriche Fiammiferi e Affini. Sulphuric acid, potash fertilizers, dyestuffs, nitrocellulose lacquers, photographic film, soap, glycerine, and chlorates are all manufactured. The S.A. Lavorazione Pelli ed Affini is the principal firm in the tanning and ancillary industries, which include the working and dyeing of furs and fish-skins. The most important of the leather goods are saddlery, tooled leather, upholstery, industrial belting, brake and clutch linings, travel goods, gloves, and boots and shoes. The rubber industry is dominated by the Società Italiana Pirelli, which employs 12,000 persons and makes a wide range of products including electric cables, tyres of all sorts, footwear, sports goods, &c. S.A. Italiana Industria Gomma e Hutchinson and Ursus Gomma S.A. are also important and make a wide range of products. In addition there are numerous smaller firms.

The printing, publishing, and stationery trades are all on a large scale and demand large quantities of paper and newsprint. The manufacture of paper for packing and of boxes for the city's industries are also notable. The paper-mill of Cartiere A. Binda is one of the largest in the country. In addition to a wide range of luxury goods nearly all the normal requirements of a large city are manufactured or processed locally, the preparation of foodstuffs being of outstanding importance.

Communications

Railways. The Central Station at Milan is the most important junction in Italy (Fig. 4), and the converging point of the following main lines:

1. St. Gotthard, Chiasso, Como; double track, electrified.
2. Simplon, Domodossola, electrified, double track, to Arona, single track to Gallarate, and electrified, double track, to Milan.
3. Turin, Novara; double track.

4. Genoa, Pavia; double track, electrified.
5. Rome, Florence, Bologna; double track, electrified.
6. Venice, Verona, Brescia; double track.

Other lines run from the Central Station to:

1. Alessandria; double track, electrified, to Abbiategrasso, single track to Mortara, double track to Alessandria.
2. Varese and Porto Ceresio; electrified, double track to Varese, single track beyond. This forms part of the Simplon line as far as Gallarate, which is also the junction for Laveno and Luino.
3. Lecco, Sondrio, and the Engadine; single track, electrified beyond Monza on the St. Gotthard line.
4. Bergamo; the double track Venice line to Treviglio, single track beyond.
5. Bergamo via Usmate; Lecco line to Usmate, single track beyond.
6. Cremona; Venice line to Treviglio, single track beyond.

From the Stazione Nord a double-track, electrified line runs to Saronno, from whence there are branches to Seregno, Como (Nord), Varese (Nord) and Laveno, and Novara. A single-track, electrified line runs to Erba and Canzo-Asso.

Tramways. Electric tramways traverse the principal streets of the city and the service known as *circonvallazione* encircles it outside the gates. There are also electric tram services to the suburbs and neighbouring towns including Abbiategrasso, Magenta, Castano, Gallarate, Varedo, Mombello, Seregno, Giussano, Como, Monza, Carate, Vimercate, Bergamo, Gorgonzola, and Vaprio.

Roads. There are autostrade from Milan to Sesto Calende (Lake Maggiore), Varese, and Como. The autostrada from Turin to Brescia passes north of Milan. Road 9 (Via Emilia) runs from Milan to Rimini, and road 11 from Turin to Venice passes through the city, as does road 35 from Chiasso to Pavia. Road 33 goes from Milan to the Simplon pass along the west side of Lake Maggiore and road 36 goes to Lecco and up the east side of Lake Como. Other main roads lead to Abbiategrasso and Casale Monferrato, Varese, Bellagio, and Crema. There is also a dense network of secondary roads.

Waterways. Milan is linked with the F. Ticino by the Naviglio Grande and Pavia canals, and with the F. Adda by the Martesana canal. The two former canals take barges of up to 40 tons, and the latter of not more than about 25 tons.

Airways. The chief airport for Milan is the Aeroporto Forlanini about 2 miles east of the city beyond the F. Lambro, where there is also a seaplane base. There is another airport at Bresso, north of the city. In 1939 Italian services were operated to Rome, Venice, Turin, Vienna-Budapest, Zagreb-Belgrade, Frankfurt-Cologne-Rotterdam-Amsterdam, Brussels, and Paris-London.

MÓDENA. Altitude 115 feet. Latitude $44^{\circ}38'N$. Longitude $10^{\circ}55'E$. Population 50,541. Provincial capital. Seat of archbishopric. Chamber of Commerce.

Position and Site

Modena lies midway between the Secchia on the west and the Panaro on the east. It extends on both sides of the Via Emilia, where it is crossed by the trans-Apennine route from Lucca and Pistoia and its northern continuation to the crossing of the Po at Ostiglia, and thence to Verona and the Alps. Other routes link Modena with the Po crossing at S. Benedetto Po, and with the main route to the Venetian plain at Ferrara. Minor routes from the Plain, the Apennine foothills, and river valleys converge on Modena, which is an important route and commercial centre and market for the surrounding rich fields and vineyards. These stretch away into the Plain and up the gradually rising slope of the Apennine foothills on the south. Irrigation channels and canalized streams pattern the surrounding fields and thread their way through the suburbs of the city.

The city covers a hillock crowned by the most ancient section, of which the narrow symmetrical streets betray its Roman origin. Curving streets spread round this nucleus and mark its gradual growth to the limits of the medieval city. The walls and moat which once defended it have been replaced by broad avenues, and the Cittadella lies close outside them on the north. Suburbs have spread all round the ancient city, especially to the south and north near the railway, and to the east along the Via Emilia.

History

The ancient Mutina was a Gallic city, probably of Etruscan origin, which was fortified by the Romans at the time of the Second Punic War (218 B.C.). Later it became a Roman colony. After suffering devastation and decline during the barbarian invasions it revived in the eleventh century, first as part of the dominions of Matilda,

Countess of Tuscany, and then as a free commune. Its allegiance to the Emperor Frederick II subjected it to attack from its more powerful neighbour Bologna, and it was in defence of Modena that Frederick II's son, Enzo, engaged the Bolognese forces at La Fossalta, 2 miles from the city, in a battle which led to the capture of Modena and Enzo's lifelong imprisonment (1249-1272). In 1288 Modena recognized Obizzo d'Este as lord and, from that time until 1859, the fortunes of the city are linked with those of the Este family. Driven out in 1306, they returned in 1326, and in 1452 Borso d'Este was made Duke of Modena and Reggio by the Emperor Frederick III. Julius II seized Modena in 1510, in the course of his attempt to bring all the Este dominions under his rule, but Duke Alfonso I recovered it in 1527 and was confirmed in his possession by the Emperor Charles V. When, in 1597, the elder line of Este died out, the younger line ceased to be Dukes of Ferrara but remained Dukes of Modena. Maria Beatrice, the heiress of the last Este Duke, was married in 1753 to Archduke Ferdinand of Austria. In 1797 Modena with Reggio became part of the Cispadane Republic and remained under French control until 1814, when the dukedom was revived in favour of Francis IV, the son of Ferdinand and Maria Beatrice. In 1831 Francis IV lent an ear to the designs of Ciro Menotti to throw off the Austrian yoke and make the Duke of Modena King of Central Italy, but Francis, who was a tyrant at heart, betrayed the patriot cause to the Austrians and sent Menotti to the scaffold. The last Duke of Modena, Francis V, was deposed in 1859 shortly before Modena was incorporated in Italy.

Public Buildings and Monuments

The outstanding monument in Modena is the cathedral, of which the foundation-stone was laid in 1099. Built on the site of an earlier basilica, it is likely that Countess Matilda aided its construction. The lovely campanile known as the Ghirlandina was finished in 1319. The Palazzo Reale, built by Francesco I, Duke of Modena, in the seventeenth century, is a vast building, now a military school. Modena is the heir of the treasures of the house of Este, brought thither from Ferrara in 1597, added to by later dukes, and bequeathed to the city by Francis V. These are now collected for the most part in the Palazzo dei Musei, and include the Biblioteca Estense, containing over 8,000 manuscripts as well as valuable printed books and a fine picture gallery. Perhaps the gem of the collection is the portrait of Francesco I by Velasquez painted in Spain in 1639.

Industry

Engineering, chemicals, food, and straw-hat making are the most important industries of Modena, which is also an agricultural market. A Fiat subsidiary makes tractors, whilst two firms manufacture machine-tools, and another gears. The Montecatini combine has a superphosphate plant, and another chemical works produces oxygen gas, cream of tartar, and tartaric acid. Sausages, confectionery, cheese, tomato sauce, and liqueur are the most notable of the food products.

Communications

Railways. Modena is on the main double-track and electrified line from Milan to Bologna. The branch-line to Mantua and Verona is single track to Dossobuono and double track from there to Verona, whilst the line to Ferrara via Cento is single track. There are also electric railways from Modena to Mirandola, Sassuolo, and Vignola.

Tramways. The city and suburbs are served by electric trams.

Roads. Road 9 (Via Emilia) from Milan to Rimini is crossed in Modena by road 12 from the Brenner pass and Verona to Pisa. Another main road leads to Carpi and Mantua, whilst secondary roads go to Vignola and S. Giovanni in Persiceto. In addition a network of minor roads converge on Modena.

Waterway. Modena is connected with the F. Panaro by the Modena canal, which is, however, restricted for navigation to the winter months.

Airfield. The Guido Colli landing-ground is immediately beyond the western suburbs.

NOVARA. Altitude 522 feet. Latitude $45^{\circ} 26' N$. Longitude $15^{\circ} 7' E$.

Population 52,269. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site

Novara is built on a low gravel hill which rises between the T. Agogna on the west and the T. Terdoppio on the east, and guards the crossing of the F. Ticino 7 miles to the east on the main route from Turin to Milan. The city has always been strategically important, for it is the chief route centre for the section of the Plain enclosed on the west and east by the rivers Sesia and Ticino, and on the south by the Po, each river forming a considerable barrier. Two main

routes cross in Novara, the Turin–Milan–Venice route running from west to east and a main south–north route from Alessandria to the valley of Lake Maggiore and the Swiss frontier. Two other routes give access to the Alps through the Val Sesia and the valley of Lake Orta, while a route from Mortara links Novara with main routes south of the Po. Numerous minor routes converge from the surrounding agricultural lands. Railways radiate in many directions, and the west–east Cavour canal, 2 miles north of Novara, provides water for the irrigation of the surrounding agricultural land, which south and west of the city is largely under rice.

The site of Novara, like that of many other cities of the Plain, was chosen for defence. Novara commands the surrounding plain from the low rise on which it is built, and its position is further strengthened by the isolated Cittadella on the south and by the Agogna and Terdoppio rivers on the east and west. Novara retains the pentagonal shape determined by the walls and bastions of the ancient city, although modern suburbs spread down over the plain on the south and west, and near the extensive railway station and marshalling yards on the east. Beyond the railway the north–south Cavo Quintino Sella, diverted from the Terdoppio, limits the city on the east.

History

Novara, having been in turn a Roman colony, the capital of a Lombard duchy, the seat of a count-bishop, and a free commune, fell to the Visconti in the fourteenth century. Thenceforth it shared the fate of Milan until it was transferred to the house of Savoy in 1735. More than once it has been the scene of fighting upon which the future history of Lombardy depended. The Duke of Orleans, who claimed Milan through his grandmother, threw himself into Novara in 1495, and was besieged there by the Italian League which drove the French from Italy. In 1500, when Orleans had become Louis XII of France, the battle of Novara sealed the fate of Lodovico Sforza and established French rule in Milan. Thirteen years later, again at Novara, the Swiss defeated the French and set up Massimiliano Sforza as Duke. Lastly, on 23 March 1849, Novara was the scene of the disastrous defeat of the Piedmontese army by the Austrians. After the battle, Charles Albert abdicated the crown in favour of his son Victor Emmanuel II, and went to die in exile. Novara early became renowned as a centre of music, chiefly owing to the two choirs founded in the sixteenth century at the cathedral and at S. Gaudenzio.

Public Buildings and Monuments

The Romanesque cathedral was entirely rebuilt in the nineteenth century; the adjoining baptistery has eight Corinthian columns of a good Roman period, and these point to its origin as a pagan temple. The Basilica of S. Gaudenzio, built in 1577 by Pellegrini Tibaldi, presents a striking effect with its tall cupola supported by two tiers of columns; it contains a large altar-piece (1514), one of the best works of Gaudenzio Ferrari, a native of Novara who was much influenced by Leonardo da Vinci. In the Palazzo Bellini is the hall in which King Charles Albert signed his abdication in 1849, and the street bearing his name has a monument to him in the shape of a broken column. The Palazzo del Mercato, which houses the museum, and the Ospedale Maggiore are imposing buildings of the nineteenth century. Opposite the Mercato are the remains of the Sforza castle, now a prison.

Industry and Commerce

The city is an industrial and agricultural centre. The industries are, for the most part, confined to three suburbs. There are small metallurgical industries in the southern suburbs; metallurgical and engineering works in the western suburb of S. Martino; and, most important of all, textile mills (cotton and silk), chemical factories (synthetic ammonia and acetic acid), and rice-polishing mills in the north-eastern suburbs, including S. Andrea and S. Agabio. The manufacture of organs, pianos, and furniture is also notable. An important agricultural market is held every Monday and Thursday, and through it pass four-fifths of the production of Italian gorgonzolas, many of which are exported to other European countries. Novara is renowned for the Istituto Geografico de Agostini, from which books and maps are exported all over Italy and Europe.

Communications

Railways. Novara is on the double-track line from Milan to Turin. A double-track line diverges to Alessandria and single-track lines to Varallo, Domodossola, Arona, Luino, and Saronno. A double-track line from Novara to Biella has recently been opened. The steam tramways to Biandrate and Vigevano are now superseded by motor-buses.

Roads. Novara is on road 11 between Turin and Milan. Road 32 runs from Novara to Arona on Lake Maggiore, where it joins road 33 to the Simplon pass. Other main roads lead to Varallo and the Val Sesia, up the Agogna valley to Lake Orta, to Varese, and to

Mortara. The autostrada from Turin to Milan passes just north of the city.

Airfield. There is an airfield about 7 miles to the north-east of the city, midway between road 32 on the west and the F. Ticino on the east.

ORVIETO. Altitude 1,033 feet. Latitude $42^{\circ} 43' N$. Longitude $12^{\circ} 7' E$. Population 8,883. Seat of bishopric.

Position and Site

Orvieto is situated on an eastward spur of the Mi. Volsini overlooking the valley of the T. Paglia shortly above its confluence with the Tiber. Across the valley rises the north-south Trasimeno-Narni ridge. The city guards the crossing of the T. Paglia where four routes meet. The main route from Arezzo and the north enters the Paglia valley along the valley of the tributary T. Chiani which breaks the steep valley wall east of Orvieto. This route is continued west from Orvieto and follows the upper slopes of the eastern flanks of the Mi. Volsini to join the road from Siena to Rome. Another route from the west coast skirts the northern edge of the Mi. Volsini and, east of Orvieto, crosses the Trasimeno-Narni ridge to Todi. Terni is reached by another route along the Paglia and the Tiber valleys which, at Narni, joins a route to Rome.

The city is magnificently situated on an oval flat-topped, cliff-edged rock rising from rounded hill-slopes. Ancient walls surround the city, rising above the rock-face, and the square fortress looks eastwards across the valley 650 feet below, where, near the railway station (407 ft.), a small suburb has developed. Settlements dot the hill-slopes surrounding the city, but its expansion has been limited by its site (II, Plate 37).

History

Orvieto, as its monuments testify, was an important Etruscan city, but the attempts to identify it either with the original Velsina, from whence the inhabitants were driven to found a new city at Bolsena, or with Fanum Voltumnae, the religious centre of the Etruscan federation, are alike conjectural. Its strong position made it no less important under the Romans, and it had a bishop as early as A.D. 590. In the early Middle Ages it was included in Tuscany, and the popes claimed it as part of the Matildine inheritance. In 1157 the citizens through their consuls made a convention with the English Pope,

Hadrian IV, by which they gave themselves in perpetuity to the Papacy. Papal suzerainty did not save Orvieto from civic faction; the Guelph Monaldi and the Ghibelline Filippeschi are mentioned by Dante as examples of the family feuds which marred the Italy of his day. Even when, in 1313, the Filippeschi were driven out, new factions developed. After a century in which no pope set foot in the city Pius II visited Orvieto in 1460, and effected a reconciliation between the rival families. Orvieto was a favourite place of refuge for the popes, and Clement VII spent six months there when he made his escape from Castel S. Angelo after the sack of Rome in 1527.

Public Buildings and Monuments

Orvieto has one outstanding monument, the cathedral of Corpus Domini, which is one of the most beautiful and interesting churches in Italy. It was founded in 1285 to celebrate the miracle vouchsafed to a priest of Orvieto who doubted the Real Presence, and was convinced by the drops of blood which appeared on the Corporal as he celebrated Mass at Bolsena (1263). The Corporal is preserved in the cathedral, enclosed in a silver-gilt reliquary with tablets of blue enamel, an admirable specimen of fourteenth-century work. Apart from this, the two chief artistic treasures of the cathedral are the façade, designed and begun by Lorenzo Maitani of Siena (1310-1330), covered with delicate bas-reliefs in pale yellow marble, and the frescoes by Fra Angelico and Signorelli in the Capella della Madonna di S. Brizio. Among other interesting medieval monuments are the Palazzo del Popolo, dating from the twelfth century, and the Palazzo Papale, begun by Boniface VIII in 1297. Here is installed the Museo Civico containing Etruscan and other antiquities, and some good pictures. A curiosity of Orvieto is the huge Pozzo di S. Patrizio made by Antonio S. Gallo for Clement VII in 1527, in order to ensure a water-supply in case of a siege. It is 200 feet deep, hewn out of the solid rock on which the city stands, and equipped with spiral staircases for the use of water-carrying asses. An Etruscan Necropolis with well-preserved tombs lies at the base of the rock, north of the city, and there is another 2 miles to the south.

Industry

Orvieto is a minor agricultural market for olive oil, cereals, and flour. Above all it is famous for its white wine. The usual artistic products of Umbrian towns are also made, pottery, wrought iron, and lace being the most notable.

Communications

Railways. Orvieto is on the main double-track electrified line from Rome to Florence. The station is $2\frac{1}{2}$ miles from the city and is connected with it by a funicular railway.

Roads. Orvieto is on road 71 from Montefiascone (on road 2) to Arezzo at the junction of road 79 to Todi and Terni. Another main road leads to Terni via Narni.

Airfield. There is an airfield near Castel Giorgio, about 7 miles west of Orvieto.

PADUA (Pádova). Altitude 39 feet. Latitude $45^{\circ} 23' N$. Longitude $11^{\circ} 54' E$. Population 90,325. Provincial capital. Seat of bishopric. University. Chamber of Commerce. International Sample Fair (June).

Position and Site

Padua stands on the banks of the F. Bacchiglione, where it divides into several branches, the main stream emerging on the east as the Canale Piovego. The city is surrounded on all sides by the intensively cultivated Venetian plain with its vineyards and irrigation ditches. About 8 miles to the west the Euganean hills rise steeply from the Plain which narrows to less than 20 miles between the hills and the coast. Routes between the western and eastern parts of the Northern Plain consequently tend to concentrate on Padua, where they meet routes from the Alps. Its importance as a route and strategic centre was early recognized and has been maintained to the present day.

Like many other important cities of the Northern Plain the necessity of defence influenced the choice of the site. Water provides the natural means of defence for Padua, which stands on a low terrace dissected by several branches of the Bacchiglione. The various stages of the expansion of the city can be traced from the walls and water channels which formed its defences. The original site of the city was limited on the west, north, and east by the main stream of the Bacchiglione, and on the south by a narrow branch curving from west to east, the space thus surrounded by water being divided from north to south by another branch. The city later spread south of the west-east arm along the right bank of the Bacchiglione, as well as north and west along the left bank. The whole area of expansion was enclosed in the sixteenth century by a wall and bastions, still almost complete, and by a surrounding moat diverted from the Bacchiglione.

Modern suburbs have spread outside these walls all round the old city, but chiefly near the railway on the north and on the west.

History

Padua is a very old city. Her legendary founder was the Trojan warrior Antenor, and the tomb erected in his honour in the thirteenth century is still extant. It is thought that the prehistoric settlers on the site of the city were Euganei, a name which survives in the Euganean hills. The Roman Patavium was the richest city in Italy after Rome; it had a large arena, a forum, temples, and bridges, while the adjacent baths of Abano were frequented, as they are to-day, for their medicinal properties. The historian Livy was a native of Padua. The Roman city was largely destroyed through the terrible devastations which it suffered from Huns, Goths, Lombards, and Hungarians, and not until the eleventh century are there signs of returning prosperity. During the investiture controversy the Bishop of Padua, who also exercised temporal power, sided with the Emperor. Henry IV made a prolonged stay in the city and his Empress Berta is credited with having granted the Paduans their liberty. What is certain is that the citizens took advantage of the papal-imperial contest to secure for themselves communal rights. Two events of the thirteenth century brought enduring glory to the city. In 1222 the university was founded, through a migration of students from Bologna; it became one of the chief centres of learning in the Middle Ages, attracting students from all parts of Europe. In 1232 Antony, the most famous disciple of St. Francis, whose eloquence and devotion had won for him the veneration of the Paduans, was canonized only a year after his death. In the same year the foundation stone was laid of the great church of S. Antonio, built over his grave. From 1237 to 1256 Padua was oppressed by the tyranny of Ezzelino da Romano. His death brought restoration of liberty and a period of power in which Padua established her authority over Vicenza and other neighbouring cities. The growing might of the della Scála lords of Verona, however, constituted a threat to her independence, which was also undermined by her own internal feuds. In the face of these difficulties the Paduans in 1318 set up a despot of their own. The Council of the Commune conferred supreme power on a leading citizen, Jacopo da Carrara, and he and his descendants ruled Padua until 1404. The Carraras showed a genuine love of the arts, and Petrarch spent some time at their court, but their lordship was for the most part undistinguished and unsuccessful. They maintained

their power chiefly through the conflicting interests, first of Verona and Venice, and later of Venice and Milan. After a long course of double-dealing, the last Carrara lord and his two sons were executed as traitors in Venice, and Padua became part of the Venetian Republic. Two episodes in her later history are worthy of mention. In 1509, after the defeat of Venice by the League of Cambrai, an imperial agent took possession of Padua, but the citizens helped the Venetian commander to regain the city, and withstood a siege from the Emperor Maximilian in person, which ended in his retreat. The rising of the students of the university in the name of liberty in 1848 is one of the many costly acts of heroism which marked the history of the Risorgimento.

Public Buildings and Monuments

The centre of civic life in Padua is the famous Caff  Pedrocchi, built in 1819 on the site of the Roman Forum. Close by is the university, popularly known as 'Il Bo', from the Ox inn which once stood there. Among its most notable features are the magnificent courtyard (1552) attributed to Andrea da Valle, and the Anatomical Theatre, built in 1594 by Fabrizio d'Acquapendente, who numbered William Harvey among his pupils. In the same central group is the Palazzo della Ragione, founded about 1164 as a monument to communal freedom. It consists of an open loggia (1306) and, above it, one vast hall decorated with frescoes. The Cathedral of the Assumption is a sixteenth-century building of which the design is ascribed to Michelangelo. Its importance is overshadowed by the Basilica of S. Antonio (1231-1307; II, Plate 11), one of the great churches of Italy. The effect of the exterior, with its six domes, is impressive rather than pleasing. The interior contains a wealth of decoration, including Donatello's bronzes on the high altar, and the Chapel of St. Antony, with the tomb of the saint, which is a jewel of the Renaissance. In the Piazza del Santo is Donatello's masterpiece in sculpture, the equestrian statue of the Condottiere Gattamelata (1453). The greatest artistic treasure of Padua is, however, the Arena Church (called after its founders Capella degli Scrovegni), decorated throughout by Giotto with a series of frescoes in which his art shows itself at its greatest. The neighbouring church of the Eremitani is celebrated for its frescoes by Mantegna, who worked in Padua as the pupil and adopted son of Squarcione, the founder of the Paduan school of painting. The church also contains tombs of the Carrara family. In the southern quarter of the town are the Museo Civico, containing

coins, antiquities, and an important collection of pictures, the Orta Botanica, which is the oldest botanic garden in Europe, and the church of Sta. Giustina. This last was originally a sixth-century building, raised in honour of the early Christian martyr whose place as the principal saint of Padua was usurped by St. Antony.

Industry and Commerce.

Padua is the commercial centre of a fertile agricultural region and exports agricultural produce, including horned cattle, pigs, poultry, eggs, fruit, vegetables, corn, and wine. The majority of the industries in the town are connected with agriculture. There are several sugar factories in the city and many in the neighbourhood, as well as an important distillery, a branch of the Distillerie Italiane, which makes alcohol, glycerine, and acetone. The manufacture of agricultural machinery, wire-netting, and metal rope is important. The output of oxygen gas, coal-tar by-products, including ink, and chemical manures is also considerable.

Communications

Railways. The double-track lines from Venice to Milan and Venice to Bologna both pass through Padua. Single-track lines run from Padua to Bassano, a junction on the Venice-Trento line; to Belluno and Calalzo-Pieve di Cadore, double track from Padua to Montebelluna; and to Legnago and Ostiglia. There is also a private standard-gauge railway to Piazzola and Carmignano.

Tramways. Electric tramways traverse the city, and there are tramways to Malcontenta, junction for Mestre and Fusina; to Abano and Torreglia; to Conselve and Bagnoli di Sopra; and to Piove di Sacco.

Roads. Padua is on road 11 from Venice to Turin, which is duplicated by an autostrada between Mestre and Padua. Road 16 goes to Rimini and road 47 to Trento. Other main roads lead to Castelfranco, Treviso, Piove di Sacco, and Adria, and secondary roads to Bagni di Sopra, Abano, and Teolo.

Waterways. The Venice-Padua waterway and the Bacchiglione are navigable by vessels of up to 300 tons, and the Battaglia canal by boats of up to 50 tons. The Brentella canal, which takes boats of up to 30 tons, gives access to the navigable section of the upper Brenta.

Airfield. The Gino Allegri airfield is to the south-west of the city.

PARMA. Altitude 171 feet. Latitude $44^{\circ} 48'$ N. Longitude $10^{\circ} 21'$ E. Population 65,126. Provincial capital. Seat of bishopric. University. Chamber of Commerce.

Position and Site

Parma is one of the line of towns and cities which have grown up along the Via Emilia wherever trans-Apennine routes emerge on to the Northern Plain. Built on terraces rising gradually to the foothills of the Apennines on the south, Parma is surrounded by a greater extent of lowland than most of the other towns on the Via Emilia. It is situated on the T. Parma at the confluence of the T. Baganza and is close to the F. Taro on the west and the T. Enza on the east. Thus the valleys of all these rivers combine to make an embayment of lowland in the Apennine foothills. Not only is this a fertile region but it has attracted trans-Apennine routes, of which the most important is that from Spezia. Other routes cross the Plain to the Alps and bridge the Po at Casalmaggiore to the north and Borgoforte to the north-east. Easy communications have led to the development of Parma as an industrial centre, and as a market for the prosperous surrounding region.

Parma lies on both banks of the T. Parma, which, immediately before entering the city from the south, is joined on its west bank by the T. Baganza. The main part of the city is on the east bank of the river and is roughly hexagonal in shape. It was once surrounded by a moat and walls, which have been replaced by wide streets. A star-shaped Cittadella on the south, near the eastern bank of the river, provided a further defence. Suburbs have developed on all sides beyond the ancient limits, especially on the west and east along the Via Emilia and near the railway station on the north.

History

Parma is mentioned in 183 B.C. as a Roman colony. During the civil war which followed the murder of Julius Caesar it sided with Brutus and Cassius (whose birthplace it was) and was consequently destroyed by Mark Antony. Augustus rebuilt the city, which prospered as a centre of the wool trade. In the fifth century it was conquered by Belisarius and held until A.D. 569 by the Byzantines, who named it Chrysopolis, or city of gold. On the break-up of the Carolingian Empire it was ruled by its bishop, who obtained the title of count. Bishop Cadalo of Parma was a stalwart champion of the

Emperor during the investiture controversy and, in 1061, was elected anti-pope with the title of Honorius II. Owing to its Ghibelline traditions, Parma enjoyed imperial protection when Barbarossa first came to Italy, but it afterwards embraced the cause of the communes, and in 1248 withstood a protracted siege by Frederick II. During the fourteenth century, when the majority of north Italian cities set up despots, none of the leading families of Parma succeeded in founding a dynasty. Rossi, Terzi, da Correggio, and San Vitali competed for supremacy, but no one of them achieved more than temporary success. In 1346 Parma fell to Luchino Visconti and remained somewhat restively under the Milanese yoke until the sixteenth century. Julius II took advantage of the French withdrawal from Italy to seize Parma and Piacenza for the Church, and from 1512 to 1545 the two cities were a bone of contention between the popes and the rulers of Milan, changing hands more than once. Paul III made his illegitimate son, Pier Luigi Farnese, Duke of Parma and Piacenza, and on Pier Luigi's murder in 1547 the duchy passed to Ottavio Farnese, the son-in-law of the Emperor Charles V. The third and most illustrious of the Farnese Dukes of Parma was Alessandro, the general of Philip II of Spain and Governor of the Netherlands. In 1731 Duke Ranuccio II died without male heirs, but his daughter Elizabeth Farnese, who was married to Philip V of Spain, devoted her energies to securing Parma for her sons. The Treaty of Aix-la-Chapelle (1748) assigned the duchy to her second son Philip, and the Bourbons reigned in Parma until the coming of Napoleon. In 1815 the duchy was bestowed on Marie Louise of Austria, the widow of Napoleon, while the dispossessed Duchess, another Marie Louise, was compensated with Lucca. On the death of the Empress in 1847, the Bourbons returned from Lucca to Parma and ruled there until 1860.

Public Buildings and Monuments

The chief monument in Parma is the magnificent Romanesque cathedral, built on the site of an earlier church by Bishop Cadalo about 1058, and completed in the thirteenth century. The façade is distinguished by its triple gallery of columns and by its sculptured portico, supported by huge lions of red Verona marble. Inside, the great spectacle is the dome, decorated with Correggio's famous fresco of the Assumption. Correggio, whose true name was Antonio Allegri (1474-1534), is the artistic pride of Parma and his works can nowhere be so well studied as in his native city. The Camera di Correggio,

once the refectory of the convent of S. Paolo, is decorated with mythological frescoes by his hand, in the dome of S. Giovanni Evangelista is his Vision of St. John at Patmos, and the Pinacoteca contains some of his finest works. Near the cathedral is another remarkable Romanesque building, the octagonal baptistery in red Verona marble, with a series of reliefs running round it. The vast Palazzo della Pilotta derives its name from the game of pilotta which was played in the courtyard. It was built for the Farnese Dukes between 1583 and 1602, and includes a theatre capable of holding 4,500 people, a museum of antiquities and the picture gallery, both founded by Duke Philip (1748-1765). The liberal arts were taught in Parma as early as the eleventh century, but the present university building dates from the sixteenth century; attached to it is an important zoological museum. Parma has a spacious public garden, reached from the Palazzo Pilotta by a bridge across the river. The charming Palazzo del Giardino was built for Ottavio Farnese in 1564 and has some good frescoes by Carracci (1601).

Industry

Parma is an important centre of the preserved provisions industry, the main products of which include sugar, sausages, meats, tomato purée and sauce, canned tomatoes, confectionery, liqueurs, wine, flour, and the world-famous Parmesan cheese. There are factories making precision instruments, agricultural machinery, and boots and shoes. Perfumes and musical instruments are also made.

Communications

Railways. Parma is on the main line, double track and electrified, from Milan to Florence. There are single track lines to Brescia, across the Apennines to Spezia (electrified), and to Guastalla and Suzzara.

Tramways. Electric trams run to Fornovo, Langhirano, Marzolaro, and Traversetolo. Other tramways in the neighbourhood have been superseded by motor-bus services. The city and suburbs are served by electric trams.

Roads. Road 9 (Via Emilia) from Milan to Rimini passes through Parma, where it is crossed by road 62 from Verona to Spezia. A main road leads to Casalmaggiore and Brescia, and various secondaries to the surrounding villages.

Airfield. There is an airfield about 2 miles to the north-west of the city.

PAVIA. Altitude 253 feet. Latitude $45^{\circ} 11' N$. Longitude $9^{\circ} 9' E$. Population 40,208. Provincial capital. Seat of bishopric. University. Chamber of Commerce. British Vice-Consul.

Position and Site

Pavia stands on the left bank of the Ticino shortly before its confluence with the Po. The Ticino with its winding course from the Alps to the Po provides a natural line of defence west of Milan, and Pavia commanding the crossing of the Ticino and that of the Po, 5 miles due south, has always been of great strategic importance. The main route from Genoa through the Apennines to Milan and the Alps uses both river-crossings, and thus Pavia has maintained its importance as a centre for routes and as a market for the cultivated plain extending in all directions. Although the only main route is that from Genoa to Milan, good roads provide easy connexion with other important centres and routeways.

Pavia, built on low gravel terraces, rises directly from the river. The city is virtually surrounded by water with the Ticino on the south, the Naviglio di Pavia, a canal linking the city with Milan, on the north and east, and the Rio Folla, which closely approaches the Naviglio di Pavia in a broad meander, on the north-west. The main part of Pavia is encircled by the remains of great ramparts and bastions built in the sixteenth century, but modern industrial suburbs have spread outside in all directions—on the south beyond the Ticino, on the east and north of the city beyond the Naviglio di Pavia, on the north-west between the Naviglio di Pavia and the Rio Folla, and west of the city, within the meander of the Rio Folla round the railway station.

History

Pavia, the Roman *Ticinum*, is of very ancient origin and became important in the last days of the Empire. In A.D. 408 it was the scene of a mutiny of the soldiers of the Emperor Honorius which led to the slaughter of many high military and civil officials suspected of favouring the disgraced general Stilicho. It was one of the principal residences of Theodoric, King of the Goths, who built here a palace, an amphitheatre, and baths. Here too Boethius, the greatest scholar of his age, suffered imprisonment on a charge of plotting against the king. During his captivity he wrote his most celebrated work, *The Consolation of Philosophy*, and was ultimately put to death in 525. From 572 to 774 Pavia was the capital of the Lombard Kings and

became known as Pavia. During the early Middle Ages the city was ruled by counts and several emperors here received the crown of Italy, among them being Berengar of Friuli (900) and Frederick Barbarossa (1155). When Milan led the party of resistance to Barbarossa in Lombardy, jealousy of her greater neighbour kept Pavia steadfastly imperialist, and the Emperor stayed for long periods in the city, conferring on it, in 1164, a charter of privileges. In the thirteenth century Pavia was harassed by the feuds of her noble families, the Gueff Langosco and the Ghibelline Beccaria. It was only after a long struggle to maintain her independence in which the leading part was played by Jacopo Bussolari, an Augustinian monk, that she yielded to Galeazzo II Visconti in 1359. Galeazzo held his court at Pavia, his brother Bernabò ruling in Milan; he founded the university, endowed it with books, and brought famous professors to teach there. Petrarch was for a time his honoured guest. When his son Gian Galeazzo became Duke of Milan in 1396 the latter was also created Count of Pavia. Both Visconti and Sforza exerted themselves to show favour to the city, making it their second capital, and doing their best to remove the impression of its subjection to Milan. Pavia had her share of the sufferings caused by the wars of Charles V and Francis I. Outside her walls in 1525 was fought the famous battle in which Francis I was defeated and taken prisoner, and it was from an adjacent convent that he wrote to his mother 'All is lost save honour'. Two years later the French general Lautrec took the city by assault and sacked it. After Charles V's final triumph, his Viceroy Ferrante Gonzaga encircled Pavia with bastions, according to the methods of fortification of his day. From this time Pavia's history corresponded to that of Milan. The city slumbered under Spanish rule, experienced a revival under the Austrians which showed itself especially in the university, was conquered by Napoleon, and played her part in the final struggle for liberation against Austria. Pavia's importance as a centre of learning dates from the ninth century when her law schools were already active. Here Lanfranc, Archbishop of Canterbury (1070-1089), a native of Pavia, received his training and lectured on law before he went north of the Alps. The university was founded in 1361 and is to-day one of the chief centres of scientific study in Italy.

Public Buildings and Monuments (Plate 15)

Pavia has a number of fine monuments representative of many phases of architectural development. S. Michele is one of the largest

and best preserved Lombard churches of the twelfth century. Its richly decorated stone façade is especially noteworthy. S. Pietro in Ciel d'Oro, so named from the gilded ceiling which it once possessed, belongs to the same period, but has been restored in the nineteenth century. It is mentioned by Dante as containing the tomb of Boethius. Its chief treasure is the fourteenth-century shrine of St. Augustine adorned with numerous statues and bas-reliefs. Monuments of the Visconti period are the Castello and the covered bridge over the Ticino (Plate 15), both of the fourteenth century. The Castello is a large rectangular building with a handsome courtyard and corner turrets, of which only two remain. The bridge is on the site of one made by the Romans and is the most picturesque feature of the city. The cathedral was built under the auspices of the architects of Ludovico Sforza's court—Amadeo, Bramante, and Leonardo da Vinci (1488–1498). Amadeo also worked on the façade of Sta. Maria del Carmine. The present university buildings were begun under Ludovico Sforza and were enlarged in the eighteenth and nineteenth centuries. The Collegio Borromeo, and the Collegio Ghislieri, both founded in the sixteenth century, the one by S. Carlo Borromeo and the other by Pope Pius V, are still flourishing halls of residence for university students. The famous Carthusian monastery known as the Certosa di Pavia is 5 miles outside the city. It was begun in 1396 by Gian Galeazzo Visconti, as a mausoleum for himself and his family, and was designed by the master-masons who built the cathedral of Milan and the Castello of Pavia. The convent was finished and the church, in the form of a Latin cross, was begun before the death of the last Visconti (1447). The decoration of the Great and Little Cloisters and the completion of the church were the charge of the Sforza Dukes. The beautiful terra-cotta decoration of the Little Cloister is typical of the best Lombard work of the fifteenth century, and the façade of the church is regarded as the *chef d'œuvre* of Renaissance sculpture. After the suppression of the Carthusian Order by the Emperor Joseph II, in 1784, the Certosa passed through various hands and suffered both loss and damage; in 1881 it became a state monument.

Industry

Pavia is one of the principal agricultural markets of the Northern Plain, and its main products are connected with agriculture. Chief among these are rice, which is polished in the city, butter, cheese, and other grains. Over 4,000 persons work in the textile mills. There are also iron foundries and factories making chemical manures,

porcelain, sewing machines, weights and measures, and stockings; smaller works manufacture harmonicas and other musical instruments.

Communications

Railways. Pavia is on the double-track electrified line from Milan to Genoa. Single-track lines run from Pavia to: Mortara and Vercelli; Alessandria, double track from Torreberetti; Broni, a junction on the Piacenza-Turin line; and Codogno, Cremona, Mantua, and Monselice, this last being a junction on the Venice-Bologna line. Trains on this line call at the Stazione Porta Garibaldi at Pavia.

Tramways. An electric tramway crosses the city from the Central Station to the Viale Gorizia. The steam-tramway from Pavia to the Certosa and Milan has been superseded by a motor-bus service.

Roads. Road 35 from Milan to Genoa goes through Pavia and joins road 10 (Turin-Venice) south of the Po. Other main roads lead to Alessandria, Mortara, Abbiategrasso, Lodi, and Cremona. There are also many minor roads, particularly east of the Ticino and north of the Po.

Waterways. The F. Ticino is navigable below Pavia for barges of up to 140 tons. The Pavia canal (*Naviglio di Pavia*) only takes barges of 40 tons.

Airways. The seaplane landing-place on the F. Ticino is at the south-east edge of the town.

PERÚGIA. Altitude 1,617 feet. Latitude $43^{\circ} 7' N$. Longitude $12^{\circ} 23' E$. Population 31,839. Provincial capital. Seat of archbishopric. University.

Position and Site

Perugia is magnificently sited on a flat-topped ridge 1,000 feet above the Tiber valley where it widens southwards into the Todi basin and is joined by the Foligno basin on the east. The ridge on which the city is built extends south-east from M. Tezio (3,150 feet) at the southern end of the Cimone chain (I, p. 315). This chain forms a broad upland between the Tiber valley on the east and the Val di Chiana and Lake Trasimeno on the west. On the south-west of the depression between Perugia and Lake Trasimeno rise the low foothills of the Trasimeno-Narni ridge. A main routeway follows the Tiber valley from Sansepolcro to Todi and Terni, where it diverges to Rome and the south-east. It is crossed in Perugia by the road

running eastwards from the Val di Chiana along the depression between Trasimeno and the Foligno basin. Another route from the Adriatic coast through the Gubbio basin enters Perugia from the hills east of the Tiber valley and continues south-west across the hills south of Lake Trasimeno to join the main road to Orvieto and Rome. Perugia, commanding the routes into the main basins of Umbria, is the natural capital of the region, a centre for commerce and industry, and the market for the fertile surrounding lands.

The city sprawls irregularly over its flat-topped ridge of which the precipitous sides are deeply dissected by tributary streams of the Tiber and provide natural defences for the city. The original nucleus of Perugia was an irregular trefoil still marked by the Etruscan wall and gateway (Arco d'Augusto), by the Porta Eburnea (1,332 ft.) on the south-west, and the ramparts of the Porta Marzia on the south-east. The city expanded through successive ages beyond this site, stretching narrower arms north-west along the lower ridge towards M. Grillo, north-east along a spur to the convent of Monteluca (c. 1,410 ft.), and south-east towards the church of S. Pietro (1,460 ft.). Broad streets run through the centre of the various sections of the city with narrow winding streets descending to the surrounding walls and ramparts. Modern expansion beyond them has been chiefly on the eastward spurs, on the less dissected hill-slopes to the south and south-west, and near the main Perugia railway station (994 ft.).

History

Perugia was one of the twelve cities of the Etruscan Confederation, sometimes allied with, sometimes opposed to, the Roman Republic. Built upon a hill-top, her massive walls enclosed an arsenal in which weapons of war were made and stored. During the war between Octavian and Antony, Perugia was burned to the ground (41 B.C.), but was rebuilt by the Emperor and named after himself—Augusta Perusia. In A.D. 547 Perugia was taken by Totila after a prolonged siege; the Bishop, S. Ercolano, was put to death by the barbarian leader for his part in the defence and became henceforth Perugia's most honoured saint. After being the capital of a Lombard duchy, Perugia was assigned to the Church by the donation of Charlemagne. Communal institutions were early developed, and by 1130, if not before, the city was ruled by ten consuls chosen from the five *riani* or wards into which the city was divided. Perugia was almost always Guelf, but her spirit of independence rendered her attitude to the Papacy one of party allegiance rather than of vassalage. Her bane

was class warfare. The nobles, supported by members of the unenfranchised classes (*Beccarini*), were engaged in a perpetual struggle with the rich trading class (*Raspanti*) for the control of the government, and internal divisions were fatal to the cause of liberty. Urban V, on his coming to Italy from Avignon, forced Perugia to accept papal legates as governors and built a fortress to hold down the city. The Great Schism brought relief, but Gian Galeazzo Visconti (1400) and Ladislas of Naples (1408) in turn took possession, and from 1416 to 1424 Perugia acknowledged the lordship of a distinguished citizen, the condottiere Braccio da Montone. During the fifteenth century two native families, the Oddi and the Baglioni, competed for supremacy. The latter triumphed, but became the victims of a terrible massacre (1500) from which Gian Paolo Baglioni alone survived. By tactful submission to Julius II (1506) Gian Paolo retained control of Perugia and his family remained in power until 1534, when Paul III drove out the Baglioni and built the formidable Rocca Paolina on the site of their ruined houses. When the soldiers of United Italy entered Perugia in 1860, the citizens marked their emancipation from papal rule by the destruction of the fortress.

Public Buildings and Monuments

Corso Vannucci, Perugia's principal street, is called after her most distinguished citizen, Pietro Vannucci, better known as Perugino. In the Corso is the Collegio del Cambio, or hall and chapel of the bankers' guild, decorated by Perugino and his pupils (1498-1507), among whom was the young Raphael. The theme of the frescoes is the harmony between the classical and the Christian traditions and it is illustrated by a medley of figures—virtues, warriors, prophets, and philosophers. It is perhaps Perugino's greatest work. The Corso leads into the Piazza del Municipio, in the middle of which is the beautiful thirteenth-century fountain, Fontana Maggiore, decorated with reliefs by the Pisano brothers. On one side is the massive merlated Palazzo Comunale with a bronze griffin (the arms of Perugia) and a Guelf lion over the principal doorway. Within the Palazzo is the Pinatoceca Vannucci, which contains a very fine collection of paintings, principally of the Umbrian school. The cathedral of S. Lorenzo is a fifteenth-century building in the Gothic style with a baroque portal. Here, in a chased and gilded reliquary, is kept the legendary marriage ring of the Blessed Virgin. Among the cathedral's many works of art the most popular is the charming Madonna delle Grazie, a picture attributed to Perugino's pupil Manni. Remains of

Etruscan walls can be seen in various parts of the city and there is an Etruscan gateway known as the Arco d'Augusto from the inscription 'Augusta Perusia' carved on it during the Augustan age (II, Plate 34). The university, dating from the thirteenth century, is now housed in the former Olivetan convent. It contains the Museo Etrusco Romano, one of the most important collections of Etruscan antiquities. Among Perugia's many churches the most interesting are the little Oratory of S. Bernardino with a façade decorated with delicate fifteenth-century bas-relief, and the great Benedictine church of S. Pietro, founded in the tenth century. The former convent of S. Severo contains an early fresco by Raphael. On the site of the destroyed Rocca Paolina is the Prefettura, an imposing nineteenth century building, and behind it is a terraced garden commanding a wide view over the Tiber valley, with Assisi standing out on the opposite hill-side.

Industry

Perugia's main industries are connected either with food, agriculture, and forestry, or with traditional and artistic ware. The canning industry is important and the Cirio company has a factory here, whilst tomatoes are also tinned by a smaller concern. Flour is milled, pasta manufactured, truffles preserved, and liqueurs and spirits distilled. The chocolate industry is of outstanding importance and the products are of the highest quality. Art furniture, china, pottery, wrought iron, embroidery, lace, and woollen goods are amongst the traditional products. The manufacture of matches, chemicals, and agricultural machinery is a more recent development.

Communications

Railways. Perugia's principal station is on the single-track line from Cortona–Terontola (a junction on the Florence–Rome line) to Foligno. It lies in the valley below the city and is connected with it by an electric tramway. From Perugia Sta. Anna (within the walls) there is a single-track electrified line to Ponte S. Giovanni, a station on the single-track electrified line from Umbertide to Terni.

Roads. Road 75 from Cortona to Foligno passes through Perugia. There are secondary roads to Gubbio, Città di Castello, Città della Pieve, and Todi.

Airfield. There is an airfield about 6 miles east of Perugia to the

east of the Tiber and immediately north of the railway to Foligno. There are also seaplane stations on Lake Trasimeno at Castiglione on the west shore and at Passignano on the north shore,

PIACENZA. Altitude 200 feet. Latitude $45^{\circ} 2' N$. Longitude $9^{\circ} 42' E$. Population 49,527. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site

Piacenza stands on the south bank of the Po immediately below the confluence of its tributary the Trebbia. The broad winding course of the Po through its marshy plain is a natural barrier to communications, and where crossing points occur settlements and routes develop. Piacenza was founded by the Romans to guard the passage across the river and the eastern entrance to the Stradella gap (I, pp. 259, 261). The Via Emilia crosses the Po at Piacenza, and continues across the river to Milan. The main route from Venice and the eastern part of the Plain to Turin crosses the Via Emilia at Piacenza, where it is joined by a trans-Appennine route from Genoa along the Trebbia valley.

The strategic position of Piacenza has always demanded fortifications. The city, elliptical in shape, is close to the Po, which here flows between steep embankments and defends the city on the north. The different stages of its development are visible in the layout of the city. An irregular growth has spread round the ancient centre which is still characterized by the rectilinear streets associated with Roman cities. The whole is surrounded by a sixteenth-century wall, a good deal of which still remains. Outside this wall a further line of defence was formed on the east and south-east by the T. Rifiuto and on the south-west and west by the T. Rifiutino, beyond which stretch the marshes bordering the F. Trebbia. A final line of fortifications was added in Napoleonic times beyond the city walls. The intervening space is now occupied on the east by industrial suburbs, the railway station, and marshalling yards.

History

The military colony of Placentia was founded by the Romans in 218 B.C., and they withdrew within its walls after their defeat by Hannibal in the Second Punic War. Its importance then, as throughout its history, lay in its position guarding a crossing of the Po. It was the junction of two Roman roads, the Via Emilia from Milan to

Rimini and the Via Postumia connecting Verona with Genoa. In the tenth and eleventh centuries it was ruled by count-bishops, but the citizens had some share in the government from very early times, and in the eleventh century it was a fully organized commune. Its position made it a convenient place of conference, and two important church councils were held here during the investiture controversy. In 1076 the north Italian Bishops, led by the Emperor Henry IV, here pronounced Pope Gregory VII's deposition. In 1095 Pope Urban marked the triumph of the papal party by a Council at Piacenza, to which the Eastern Emperor came seeking the aid of the West against the infidel, and thus prepared the way for the First Crusade. The negotiations which preceded the Peace of Constance (1183) were conducted at Piacenza, which had been a prominent member of the Lombard League. In the thirteenth century Piacenza submitted to Oberto Pelavicini, one of the early despots who controlled a group of cities in the Ghibelline interest. Later it fell to Matteo Visconti and remained part of the Milanese dominions until 1512. Piacenza never submitted willingly to Milanese overlordship, and the Sforza Dukes were always unpopular there. In 1545 Paul III made his illegitimate son, Pier Luigi Farnese, Duke of Parma and Piacenza. From that time the history of Piacenza is merged in that of her neighbour and rival, Parma, except that after 1815 Austria had garrison rights in the city.

Public Buildings and Monuments

Piacenza is an interesting old town with several fine churches, and with walls and bastions which recall its former military importance. The cathedral of Sta. Giustina was begun in 1122 and completed in 1233, all classes of the citizens subscribing towards the building. The interior has some good frescoes of the seventeenth-century Bolognese school. The fourth-century basilica of S. Antonino was once the cathedral; except for its tower and the picturesque fourteenth-century portico known as Paradiso, it has been spoiled by rebuilding. Sta. Maria di Campagna is a Renaissance church (1522-1528) and has a remarkable series of frescoes of the life of Sta. Caterina by Pordenone. Raphael's Madonna di San Sisto was painted for the high altar of the church of S. Sisto, but was sold to the Elector of Saxony and taken to Dresden in 1754. The Palazzo del Comune, popularly known as 'Il Gotico', is an elegant thirteenth-century building in which brick, marble, and terra-cotta are harmoniously blended. In the Piazza dei Cavalli are equestrian statues of Alessandro

Farnese, Duke of Parma, and his son Ranuccio, executed in bronze by Francesco Mochi. The vast Palazzo Farnese was built at the expense of the citizens by order of Alessandro's mother Margaret of Austria (1558-1593). After being used as a barracks it is now being restored to form a centre for the cultural activities of the city.

Industry

Piacenza is an important agricultural market and collecting centre for agricultural products. The principal industries are food preserving, and the main products are beet sugar, cheese, canned tomatoes, tomato purée, preserved meats, confectionery, and liqueurs. Among other branches of industry there are foundries, a royal arsenal, and engineering works making shells, cycles, tractors, agricultural machinery, and internal-combustion engines. There are also button, cardboard, and cotton-stocking factories, brick and tile works, and chemical works manufacturing superphosphates and oxygen. Near the city are several cement and lime works.

Communications

Railways. Piacenza is on the main double-track electrified line between Milan and Bologna. It is the junction for a double-track line to Voghera which gives direct communication between Bologna and Turin and Genoa. There are single-track lines to Cremona and to Bettola, the latter being electrified.

Tramways. There is an electric tramway across the river Po to S. Rocco al Porto, and the city has an electric tram service.

Roads. Piacenza is on road 9 (Via Emilia) from Milan to Rimini which crosses the Po here and also on road 10 from Turin to Monselice (for Venice). Road 45 follows the Trebbia valley to cross the Northern Apennines to Genoa.

Waterway. Piacenza has two wharves on the Po.

Airfield. Landing-ground about 9 miles south of Piacenza.

PISA. Altitude 13 feet. Latitude 43° 44' N. Longitude 10° 26' E.
Population 49,471. Provincial capital. Seat of archbishopric.
University. Chamber of Commerce.

Position and Site

Pisa stands on both banks of the Arno in the centre of the broad coastal plain of Pisa. This plain, which is bounded on the east by the ridge of M. Pisano (2,980 ft.) and on the south by the Tuscan upland,

opens eastward between them into the broad valley of the Arno, and northwards into the plain of Viareggio. Much of the plain is marshy and is undergoing reclamation. Before the silting up of the Arno Pisa was a flourishing port. Now Leghorn, at the southern extremity of the plain and linked to Pisa by a navigable canal, has outgrown in importance the city to which it owed its origin. Pisa is, however, still a focus for major and local routes. The main west coast route from Genoa to Leghorn and the south is joined in Pisa by routes along the Serchio valley from Lucca and the Northern Plain, and along the Arno valley from Florence.

The city is cut into two unequal parts by the broad sweep of the Arno. The original site was on the northern bank, but by the twelfth century the flourishing city had spread across the river and its irregular square expanse was enclosed with battlemented walls. Beyond these the city has now spread all round, but chiefly on the south where industrial suburbs have developed near the railway, southwest along the canal towards Leghorn, and east and west along the Arno.

History

Strabo mentions Pisa as one of the confederacy of Etruscan towns and although, owing to silting of the Arno and the Serchio, it was already $2\frac{1}{2}$ miles from the coast, its greatness was linked with the sea. Under the Romans it was a place of considerable importance, adorned with fine buildings and receiving marks of imperial favour. After a period of decline it rose in the eleventh century to the rank of one of the greatest commercial and sea-faring cities of the Mediterranean. The Pisans won fame through their naval exploits against the Saracens. In 1016 having driven them from Sardinia in alliance with the Genoese, they expelled their allies and became masters of the island. They fought the Saracens in Africa, destroyed their fleet at Palermo (1063), and drove them from the Balearic islands and Corsica. During the first three Crusades Pisan fleets played a no less important part than did those of Venice and Genoa. While still nominally subject to the Marquis of Tuscany, Pisa was ruled by its own consuls, and a charter granted by the Emperor Conrad II placed the commune on a solid legal basis. In the thirteenth century Pisa's position was challenged by more powerful rivals, Lucca and Florence on the mainland and Genoa at sea. The end of Pisa's greatness came with the crushing victory of Genoa at the battle of Meloria (1284), when the Pisan fleet was destroyed and the number of prisoners taken

provoked the saying 'To see Pisa you must go to Genoa'. The story of the Pisan Admiral, Ugolino della Gherardesca, who was held responsible for the defeat and was imprisoned with his two sons to die of starvation in the 'Tower of Hunger', forms one of the most tragic episodes in Dante's *Inferno*. In the fourteenth century Pisa had some prestige as a Ghibelline stronghold; the Emperor Henry VII made it his headquarters in central Italy, and died there in 1313. Yet the city's maritime supremacy was lost, and the government passed into the hands of local lords, the last of whom sold Pisa to Gian Galeazzo Visconti (1399). In 1406 Pisa fell under the Florentine yoke, which the Medici did their utmost to make acceptable by refounding the university and showing to the city other marks of favour. So deep-seated, however, was their love of liberty that in 1494 the Pisans rebelled against Florence and maintained their independence for fifteen years. From their final defeat in 1509, the history of Pisa is merged in that of Florence.

Public Buildings and Monuments (Plate 14)

The artistic pride of Pisa lies in the Piazza del Duomo, in the north-west corner of the town, with the wonderful group of buildings comprising the cathedral, the campanile, the baptistery and the Campo Santo. The cathedral, begun in 1063, is a basilica with nave and transepts, covered by a dome over the crossing. It is built of white marble, ornamented with black and coloured bands. The campanile, better known as the Leaning Tower, dates from 1173; it consists of tiers of marble columns on round arches forming open galleries; 179 feet high and leaning 13 feet out of the perpendicular, it is the most remarkable monument of its kind in the world. The baptistery also dates from the twelfth century, and the beautiful octagonal font has been used for all christenings in Pisa from the thirteenth century onwards; the pulpit (1260) is Nicola Pisano's masterpiece. The Campo Santo, or cemetery, is famous for its wealth of frescoes and monuments including the tomb of the Emperor Henry VII. The Arno flowing through the centre of the city, with its bridges and open quays, gives to Pisa peculiar charm. The Museo Civico, in the convent of S. Francesco, has an interesting and representative collection of Tuscan art. Among the many fine churches that of Sta. Maria della Spina on the Lungarno is a gem of Pisan architecture. Built originally for sailors about to go to sea, it takes its name from a fragment of the Crown of Thorns given to the city by a Pisan merchant.

Industry

Pisa's main industries include the manufacture of bricks, tiles, china, earthen and stone ware, and terra-cotta. The manufacture of all kinds of glass, most notably of mirrors and painted glass, are particularly important. Tanneries are numerous and the production of artistic leather goods and furniture is profitable. The greater part of these goods find a ready sale amongst the tourists who flock to the city.

The processing of local agricultural crops is important and there are pasta factories and olive-oil and flour mills. The city has a small textile industry working cotton and local silk, whilst the small engineering industry is mainly connected with the production of aircraft.

Communications

Railways. Pisa is a junction on the main Genoa-Rome double-track electrified line. Two lines branch off to Florence, the one via Empoli being double track, and the other, via Lucca and Pistoia, being single track as far as the latter place. A single-track line avoiding Leghorn passes through Colle Saletti to rejoin the main line to Rome at Vada. The railway to Pisa Marina and from thence by the coast to Leghorn is private and electrified. Electric tramways ply from the station to the cathedral and along the north bank of the Arno.

Roads. Road 1 from Genoa to Rome passes through Pisa, where main roads branch inland to Lucca and Modena (12), to Florence (67), and to the coast at Pisa Marina.

Waterway. The Pisa-Leghorn canal is navigable for barges up to 600 tons.

Airfield. The S. Giusto airfield is 2 miles south of the city and close to the Pisa-Leghorn canal. There is also a sea-plane station at Marina di Pisa.

PISTOIA. Altitude 213 feet. Latitude $43^{\circ} 52' N$. Longitude $10^{\circ} 56' E$.
Population 29,532. Provincial capital. Seat of bishopric.

Position and Site

Pistoia is situated at the north-western end of the basin of Florence. Foothills of the Northern Apennines rise on the east, north, and north-west, whilst the semicircle of hills is completed on the west by M. Albano. This south-trending ridge forms a barrier between the

basin of Florence and the basins of the lower Arno. The saddle of Serravalle (600 ft.) separates M. Albano from the foothills of the Apennines and provides access to the basin of Florence for the main route from Lucca and the west coast. Pistoia controls this pass and also the entrance north of the city to the Apennine section of the Ombrone valley which is followed by one of the main trans-Apennine routes from Bologna to Florence. In addition the main routes along both sides of the basin from Florence unite at Pistoia.

The city is near the east bank of the Ombrone where the floor of the basin rises gradually northwards. The oldest part of the city surrounds the cathedral in the centre, and concentric lines of streets indicate its gradual development from the hexagonal medieval city to the later rectangular extension of which the walls are for the most part still standing. A tributary of the Ombrone, the T. Brana, once formed a defensive moat and still follows the walls on the north and east. Modern suburbs have spread in all directions near the main routes, but chiefly on the west and south, near the railway station.

History

The Roman Pistoria was noted as the scene of the defeat of Catiline by the army of the Republic in 62 B.C. and Dante alludes to the tradition that the city was founded by the survivors of Catiline's soldiers. Medieval Pistoia formed part of the dominions of the house of Tuscany, and became a free commune on the death of the Countess Matilda (1115). There followed a period of increasing prosperity for the city. The Statutes of the Commune (1177) were celebrated among medieval municipal codes. The banking houses of Pistoia lent money to the Kings of France and England and to the house of Anjou in Naples, the natural allies of a Guelf city. In the course of the thirteenth century the second circle of walls, fortified with sixty towers, was completed. Florence, however, was determined to bring Pistoia under her yoke, and found a means to this end in the rivalry between two branches of the Cancellieri, who were among the leading Pistoian families. On the outbreak of civil war Florence intervened and brought the leaders of both 'Black' and 'White' Cancellieri to Florence. The result was to stimulate Florentine internal feuds and to supply the names by which rival parties in Florence came to be known. In 1305 Pistoia was forced to submit to Florence after a bitter siege, and later the city fell to the Ghibelline tyrant, Castruccio Castracane. On his death, in 1329, Pistoia regained some measure of liberty under the protection of Florence, which for the next two

centuries made it a matter of policy to control Pistoia by factions in the same way that Pisa was controlled by fortresses and Prato by poverty. In 1530, fearing occupation by the imperial troops engaged in besieging Florence, Pistoia made its submission to Pope Clement VII. It thus passed definitely under the rule of the Medici and henceforth its history is merged in that of Florence and of the Grand Duchy of Tuscany. Cino da Pistoia (1270-1336), the friend of Dante and one of the chief poets of his day, was a native of the city.

Public Buildings and Monuments

Pistoia is a city of very considerable artistic interest and the works of many leading architects, sculptors, and painters are to be found among her monuments. The picturesque Piazza del Duomo, in the centre of the town, is surrounded by a remarkable group of buildings. The cathedral, dedicated to S. Zenone, Bishop of Verona, is a twelfth-century building with a porch added in 1311; over the main entrance is a beautiful terra-cotta by Andrea della Robbia of the Virgin and Child between two angels. Inside, the cathedral has been modernized and is interesting chiefly for such works of art as the tomb of Cino da Pistoia by Sienese sculptors of the fourteenth century, the magnificent silver altar frontal of St. James, begun in 1287, the statue of St. James, by Brunelleschi, and Lorenzo di Credi's charming altar-piece in the Cappella del Sacramento. The noble thirteenth-century campanile is still called the Torre del Podestà, indicating that its bell was used to summon the citizens not only for ecclesiastical but for civic and military purposes. Opposite the cathedral is the octagonal baptistery, begun in 1337 from the design of Andrea Pisano. The thirteenth-century Palazzo del Comune and the fourteenth-century Palazzo del Podestà or Pretorio, both splendid examples of civic architecture, complete the group. Pistoia has been called a city of churches, and there are at least half a dozen in addition to the cathedral which claim attention. The church of S. Giovanni Fuorcivitas was founded in the eighth century and is so called because it lay outside the ancient circle of walls. The façade has a twelfth-century relief by Gruamonte, who may have been the architect of the church, and inside there is a pulpit of great beauty by Fra Guglielmo, a pupil of Niccolò Pisano (1270). In the church of S. Andrea is a famous pulpit by Giovanni Pisano (1298-1301), modelled on his father's pulpit at Pisa. S. Domenico was restored in 1303 by Giovanni Pisano, and has fine Renaissance tombs, by Rossellino, and an altar-piece by Ghirlandaio. S. Francesco is noteworthy for its frescoes of the school of Giotto. The Madonna

dell' Umiltà was designed by Ventura Vitoni, a pupil of Bramante (1494-1509). The Ospedale del Ceppo, so called from the hollow tree-stump in which alms for the sick were collected, has a remarkable terra-cotta frieze of the sixteenth century, and the Museo Civico has an interesting collection of pictures.

Industry

Pistoia, like other Tuscan towns with an interesting history, specializes in the manufacture of artistic goods and reproductions of antiques. There are brass foundries for the artistic metal industry, and workshops for furniture, musical instruments, leather-work and hats. Tiles and bricks are made and also pasta. As the pistol is supposed to have originated in Pistoia and taken its name from the city, it is not surprising to find a small engineering industry here.

Communications

Railways. Pistoia is on the old line from Florence to Bologna by the Reno valley. This line is electrified throughout, but is only double track between Florence and Pistoia. There is a single-track line to Lucca and Pisa.

Roads. Road 66 from Florence passes through Pistoia on its way to join road 12 from Lucca to Modena. Road 64 to Bologna by the Reno valley branches off road 66 near Pistoia. The main road from Florence via Prato and Pistoia to Lucca is followed closely for much of its course by the Florence-Viareggio and Pisa autostrada which passes close to Pistoia on the south.

Airfield. There is an airfield immediately south of the city.

POTENZA. Altitude 2,700 feet. Latitude $40^{\circ} 38'$ N. Longitude $15^{\circ} 48'$ E. Population 18,872. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site (Plate 16)

Potenza is situated midway between the gulf of Salerno and the gulf of Taranto, almost at the centre of the peninsula, and is thus an important meeting-point for routes between the west and east coasts and those running north and south through the peninsula. The city, standing above the north bank of the east-flowing Basento, commands the western end of its steep-sided valley where a fan of tributaries joins the main stream. The east Lucanian Apennines rise north and east of Potenza with peaks over 3,250 feet high. On the west the col (2,858 ft.) in the North Lucanian Apennines between M. li Foi di

Picerno (4,429 ft.) on the north and M. Pano (3,819 ft.) on the south enables the main routes from Salerno along the Sele valley and from the Vallo di Diano to cross the watershed into the Basento basin. North of M. li Foi di Picerno the main route from Naples and Avelino converges on Potenza and continues east above the Basento valley to Taranto. This is joined a little to the east of Potenza by a route from Bari. In addition a ridge route from Barletta and the Ofanto valley enters Potenza from the north and continues southwards to Corleto Perticara, where roads diverge to the gulf of Taranto and to the main route system of Calabria. The region round Potenza is sparsely populated, and settlements and routes tend to keep to ridges, or the more stable upper slopes, to avoid landslips.

Potenza extends from east to west 720 feet above the Basento along a sandstone ridge of M. li Foi di Picerno which is free from landslips. As this spur is cut into by steep tributary valleys of the Basento on either side of Potenza, the site of the city has strong natural defences. From the north-eastern end near the cathedral (2,697 ft.) the city slopes towards the new public buildings on its southern edge (2,543 ft.). The city was almost entirely rebuilt after an earthquake in the middle of the last century and expansion beyond the original site was limited. It has been confined chiefly to the slopes north-west of the city near the Stazione Superiore (2,431 ft.), to the east in the direction of the church of S. Rocco (2,461 ft.), and along the southern edge of the city and below it near the Stazione Inferiore (2,201 ft.). Isolated settlements are scattered over the surrounding slopes.

History

The origin of Potenza is obscure, but after its conquest by the Romans it became a flourishing city of the Empire. It was situated at that time nearer the river Basento, and was transferred to its present hill site towards the end of the twelfth century. Having fallen in turn to the Lombards, the Normans, and the Hohenstaufen, it embraced the cause of the young Conradin against Charles of Anjou, and suffered devastation from the Angevins on this account. It was granted as a fief to various lords, including Michelotto Attendolo, from whose family sprang the Sforza Dukes of Milan. Here, in 1502, French and Spanish leaders met in a last attempt to settle their differences with regard to the partition of the Neapolitan kingdom. In 1799 it was the first city in the Neapolitan kingdom to plant the tree of liberty, the bishop taking part in the proceedings. In 1806 it took the place of Matera as the capital of Basilicata, since 1933

known as Lucania. The city has suffered much from earthquakes. Among ancient customs of Potenza is the *Processione dei Turchi*, when on the feast of S. Gerardo, patron of the city, a ship with a crew dressed as Turks and Moors, together with a statue of S. Gerardo, is drawn in procession round the city, accompanied by the clanging of a bell.

Public Buildings and Monuments

The cathedral of S. Gerardo, the twelfth-century Bishop of Potenza, was rebuilt at the end of the eighteenth century by Antonio Magri, a pupil of Vanvitelli. The church of S. Francesco, founded in the thirteenth century by the first companions of St. Francis, has a fine Renaissance portico. The Romanesque church of S. Michele preserves its original form. In the Museo Provinciale Lucano the archaeology of the region is well represented.

Industry

Potenza is the main agricultural town and industrial centre for a wide region. The industries meet local needs and are small. The engineering works manufacture iron and electrical goods, agricultural machinery, and wire rope. The making of bricks, tiles, and building materials is also locally important.

Communications

Railways. Potenza Inferiore (1½ miles from the city) is on the electrified line from Naples to Brindisi, double track as far as Battipaglia, single track beyond. A single-track line runs from Potenza Inferiore to Foggia. This is followed as far as Avigliano Lucana by the narrow-gauge railway to Bari, which has Potenza Città as its principal station in the city. The line from Potenza Città to Laurenzana is also narrow gauge.

Roads. Potenza is on road 7 (Via Appia) between Benevento and Taranto. Road 92 goes south from Potenza to Terranova di Pollino. Road 93 goes north to Melfi and Barletta. Road 94 goes west to Auletta where it joins road 19 from Salerno to Catanzaro. Road 96 branches from road 7 east of Potenza for Bari.

RAGUSA. Altitude 1,631 feet. Latitude 36° 55' N. Longitude 14° 44' E. Population 40,480. Provincial capital.

Position and Site

Ragusa is in the south-east corner of Sicily near the edge of the southern plateaux of the Mi. Iblei, where the main south coast route

crosses the gorge of the F. Irminio. The town stands on broad steep-sided terraces rising from the Irminio on the east and dissected by the tributaries T. Leonardo and T. Sta. Domenica, which limit the town on the north and south. The gorge-like valleys of the rivers provide natural defences on the north, south, and east, while higher slopes (2,018 ft.) rise on the west. Ragusa divides naturally into three parts. The oldest, Ragusa Inferiore or Ragusa Ibla, overlooks the Irminio valley and slopes upwards from about 1,180 feet to the medieval castello (1,263 ft.) on its eminence in the centre. A narrow neck on the west, sloping upwards to about 1,800 feet, joins the older city to Ragusa Superiore. The third and newest part is the Quartiere Littorio which extends round the main railway station (1,673 ft.) to the south of the gully of the S. Domenica.

History

Ragusa until recent times consisted of two parts, the upper town, said to have been founded by exiles from Cosenza, and the lower town, now known as Ragusa Ibla. The latter is on the site of the ancient city of Hybla Heraea, which was taken from the Sicels by Hippocrates of Gela in 491 B.C., and thus became subject to Greek influence. Conquered by the Saracens in A.D. 848 the subsequent history of the city is without importance.

Public Buildings and Monuments

The lower city has few ancient or medieval remains as it was largely destroyed by an earthquake in 1693. The old castle, dominating the town, survives and the church of S. Giorgio Vecchio has a fine Renaissance portal. The upper city is largely a product of the eighteenth century. Its most interesting features are the imposing flight of steps leading down from the church of Sta. Maria della Scala to Ragusa Ibla, and the great double-arched Ponte dei Cappuccini spanning the valley below.

Industry

Ragusa is notable mainly for the asphalt mines near by, though the agriculture of the neighbouring fertile district is also important. Asphalt is treated in Ragusa and industrial oil distilled. The most outstanding firm is the Societa Italiana Asfalti, Bitumi, Catrami, e Derivati which was supported by the Government. The main agricultural products are cereals, grapes, wine, flax, sheep, and cheese. Horse-breeding is important locally.

Communications

Railways. The town has two stations, Ragusa and Ragusa Ibla. Ragusa is on the single-track line from Syracuse via Noto to Licata and Canicatti. A narrow-gauge railway runs from Syracuse to Ragusa via Giarratana. Ragusa Ibla is a station on the line to Noto, the line from Ragusa descending to it through a series of tunnels.

Roads. Ragusa is on road 115 which follows the south coast from Syracuse to Trapani. Secondary roads run north to Vizzini and Palazzolo, and south to Marina di Ragusa.

RÉGGIO NELL' EMILIA. Altitude 190 feet. Latitude $44^{\circ} 42' N$. Longitude $10^{\circ} 39' E$. Population 49,069. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site

Reggio nell' Emilia stands on the Via Emilia where it is crossed by the trans-Apennine route from Spezia, which emerges from the valley of the north-flowing T. Crostolo and proceeds beyond Reggio to Gualtieri, Borgoforte, and the Plain north of the Po. The position of the city at the intersection of these routes, and between the fertile hill-slopes of the Apennine foothills and the level fields and vineyards of the plain, has made it an industrial and marketing centre on which numerous minor roads converge.

The site of Reggio is on the east bank of the Crostolo where a terrace rises gently towards the Apennine foothills. The Via Emilia divides the city from north-east to south-west, and immediately on either side of it is the ancient nucleus forming the centre of the city. Curving streets spread outwards from this nucleus towards the broad avenues which have replaced the walls and moat once surrounding the hexagonal outline of the city. Suburbs, threaded by canalized streams and irrigation channels, extend beyond the T. Crostolo and all round the ancient limits, especially on the north-east near the railway station.

History

Reggio Emilia was known to the Romans as Regium Lepidi, having been built by Emilius Lepidus as a stronghold on the highway called by his name (Via Emilia). Its modern name distinguishes it from Reggio di Calabria. Reggio formed part of the dominions of Matilda, Countess of Tuscany, and her castle of Canossa, the scene of the famous meeting between Pope Gregory VII and the Emperor Henry

IV (1077), is in the neighbourhood. After Matilda's death Reggio emerged as a free commune and joined the Lombard League. Towards the close of the thirteenth century the city acknowledged the lordship of Obizzo d'Este of Ferrara. In 1306 it threw off the Ferrarese yoke, and in the course of the next hundred years passed successively under the rule of the Gonzaga of Mantua, the Visconti of Milan, and Ottobuono Terzi of Parma. Niccolo d'Este, however, regained possession of the city in 1409, and but for a brief period of papal domination (1512-1523) Reggio was subject to the house of Este until 1796. After the transference of the Este Dukes from Ferrara to Modena (1597) Reggio became their second capital. It was the first Italian city to raise the flag of liberty in 1796, and was included with Modena in the Cispadane Republic. It was restored to Francis IV, Duke of Modena, by the Congress of Vienna and in 1859 entered the kingdom of Italy. The two chief men of letters of the Ferrarese court, Matteo Boiardo (1440-1494) and Ludovico Ariosto (1474-1533) were both natives of Reggio.

Public Buildings and Monuments

The symmetrical plan on which the city is built indicates its military origin. It is cut in half by the Via Emilia running from the Barriera Vittorio Emanuele to the Barriera S. Stefano; the Porta Sta. Croce on the north-east is in a direct line with the Ponta Castello on the south-west. Although there is little left of the old walls, the Strada di Circonvallazione follows their course. Reggio possesses no building of outstanding interest. The cathedral is Romanesque but largely rebuilt. In the adjacent Palazzo Comunale (1414) is the Sala del Consiglio in which the Cispadane Republic was created in 1797. The Madonna della Ghiara is a beautiful church in the form of a Greek cross built by a Ferrarese architect in Bramante's manner (1597-1619). The Public Gardens were laid out in the nineteenth century on the site of the old citadel; near them are the Museo Civico and the imposing Teatro Municipale (1857).

Industry and Commerce

Reggio Emilia is a flourishing agricultural market for a fertile region. As in all large Emilian towns the food industry based on local products is important. Pasta, cheese, preserved provisions, sausages, wine, and liqueurs are made and flour is milled. Recently a notable engineering industry has developed. The Caproni aircraft works are large for Italy, and in war-time employs about 5,000 persons,

whilst the Officine Meccaniche make steam and electric locomotives as well as railway rolling-stock and tramway equipment. The same firm is the largest manufacturer in Emilia of agricultural and industrial machinery and tools, specializing in ploughs and machinery for mills, pasta factories, silos, brickworks, &c. Chemical manures, bricks and tiles, cork goods, silk hosiery, and straw hats are also made.

Communications

Railways. Reggio is on the main double-track and electrified line from Milan to Bologna. There are single-track lines to Boretto, Carpi, Guastalla, Sassuolo, and Ciano d'Ensa.

Roads. Reggio is on road 9 (Via Emilia) from Milan to Rimini, and on road 63 from Guastalla to Spezia. There are secondary roads to Carpi and to Scandiano and Sassuolo.

Airfield. There is an airfield about $1\frac{1}{2}$ miles east of the city.

RIETI. Altitude 1,319 feet. Latitude $42^{\circ} 23' N$. Longitude $12^{\circ} 53' E$.
Population 14,366. Provincial capital. Seat of bishopric.

Position and Site

Rieti stands at the southern edge of the broad Rieti basin, a link in the chain of mountain basins which provide passage for communications and open space for cultivation and settlement in the Apennines. The Rieti basin is drained by the F. Velino and lies between the Mi. Reatini on the east and the Mi. Sabini on the west. The two mountain blocks approach each other closely at the north end, where the F. Velino enters a narrow gorge and flows into the Nera in a series of waterfalls. Across the south end a series of north-south ridges rise between the mountain blocks, and at the base of one of these ridges, the Colle Moro (2,799 ft.), Rieti stands guarding the openings of the Velino and Turano valleys into the basin. A main route entering the north end of the basin from the Nera valley at Terni leaves it on the south for Rome. Another follows the upper Velino valley, branching at Antrodoco north-east to Ascoli Piceno and the Adriatic coast, and south-east to Aquila and the south. Rieti is a marketing centre for the basin and attracts local routes from the surrounding mountain valleys. Cultivation is limited to the lower slopes and the floor of the basin at the southern end where there are numerous vineyards.

The site of the main part of Rieti is limited on the south by the F. Velino, on the west by the Fiume Nobili, an arm of the Velino, and along the north by a protecting wall between the banks of the rivers.

Across the Velino on the south a small part of the ancient nucleus guards the bridgehead. Suburbs have spread east from the city to the base of an isolated spur crowned by the Cappuccini convent (1,640 ft.), near the railway, and south across the Velino at the base of Colle Moro.

History

The ancient Reate was the capital of the Sabines. Conquered by Rome in 290 B.C., it became a prosperous municipium. In 54 B.C. Cicero, who visited it on legal business, described it and the Velino valley as another Vale of Tempe. It suffered under the barbarian invasions, but retained its importance under both Lombards and Franks. In 1149 it was conquered and destroyed by Roger II of Sicily, only to rise again, largely through the help of the people of Rome, and become a free commune. It was honoured by visits from several popes. In 1234 Gregory IX canonized St. Dominic at Rieti, and in 1289 Nicholas IV crowned Charles II of Anjou as King of Naples. Boniface VIII, when celebrating mass here in 1298, was forced to fly into the open country in his vestments, owing to an earthquake. Throughout its history the city has suffered both from earthquakes and floods and various attempts at drainage have been made. It was at Rieti, in 1821, that Pepe boldly attacked the Austrian forces sent to crush the revolution in Naples, but after a brave fight was obliged to retire and disband his army.

Public Buildings and Monuments

Rieti has retained the greater part of its thirteenth-century walls. The cathedral dates from 1109 but has been largely rebuilt; it has a fine Romanesque campanile and a Renaissance portico. The Palazzo Comunale contains the Museo Civico with a small collection of pictures. The theatre (1854) is called Teatro Flavio Vespasiano after the Roman Emperor who was born here. A Roman bridge spans the Velino, and in the convent of Fonte Colombo outside the Porta Romana, St. Francis dictated the rules of his Order in 1223.

Industry

Rieti has the usual crafts common to most central Italian towns, and in addition an important rayon and staple fibre factory, controlled by the Cisa combine, and a chemical works owned by Montecatini for the production of sulphuric acid and superphosphates. There are also small cotton and woollen mills and brick, tile, and pottery works,

whilst seeds for market are grown locally. The sugar-beet factory, dating from 1872, is said to be the first founded in Italy.

Communications

Railway. Rieti is on the single-track line from Terni to Aquila and Sulmona.

Roads. Rieti is on road 4 (Via Salaria) from Rome to Porto d'Ascoli, and is the starting-point for road 79 to Terni and Orvieto. Another main road leads to Avezzano.

Airfield. There is a landing-ground about 2 miles north of the city.

ROME (Roma). Altitude 66 feet. Latitude $41^{\circ} 54' N$. Longitude $12^{\circ} 28' E$. Population 1,094,710. National and provincial capital. Seat of the Papacy in the Vatican city; bishoprics. University. Chamber of Commerce. Stock Exchange. British Consul.

Position and Site (Figs. 5 and 6)

Rome lies in the Roman Campagna where it forms a broad saddle in the volcanic plateau extending between the Mi. Sabatini on the north, the Alban hills on the south, the Tyrrhenian coast on the west, and the foothills of the Apennines on the east. The Tiber, flowing from north-east to south-west, and its numerous tributaries have succeeded in eroding their beds some 150 feet below the general level of the plain, which has been cut into steep spurs and low hills. A group of these rising close to the Tiber forms the traditional seven hills of Rome. The Roman Campagna is roughly midway along the west coast of the peninsula and forms the only considerable break in the barrier of hills backing the coast between the lower Arno basin on the north and the plain of Campania on the south. The main coastal route, avoiding the swampy delta, crosses the Tiber at Rome where it meets the main inland route from northern to southern Italy. North of Rome this follows either the Arno and Tiber valleys, or the Via Cassia across the plateaux to their west, and, south of Rome, it continues along the Sacco-Liri valley to Naples. The valley of the Aniene, which enters the Tiber at Rome, breaches the Apennines to the east of the city and affords a natural routeway to the Central Apennines and the Adriatic coast. Rome thus has easy access to all parts of the Peninsula.

The site of the city was determined by the crossing of the river, which is made easier by the Isola Tiburina (52 ft.) and the close approach of the hills on both sides. The Roman city (Fig. 6) first

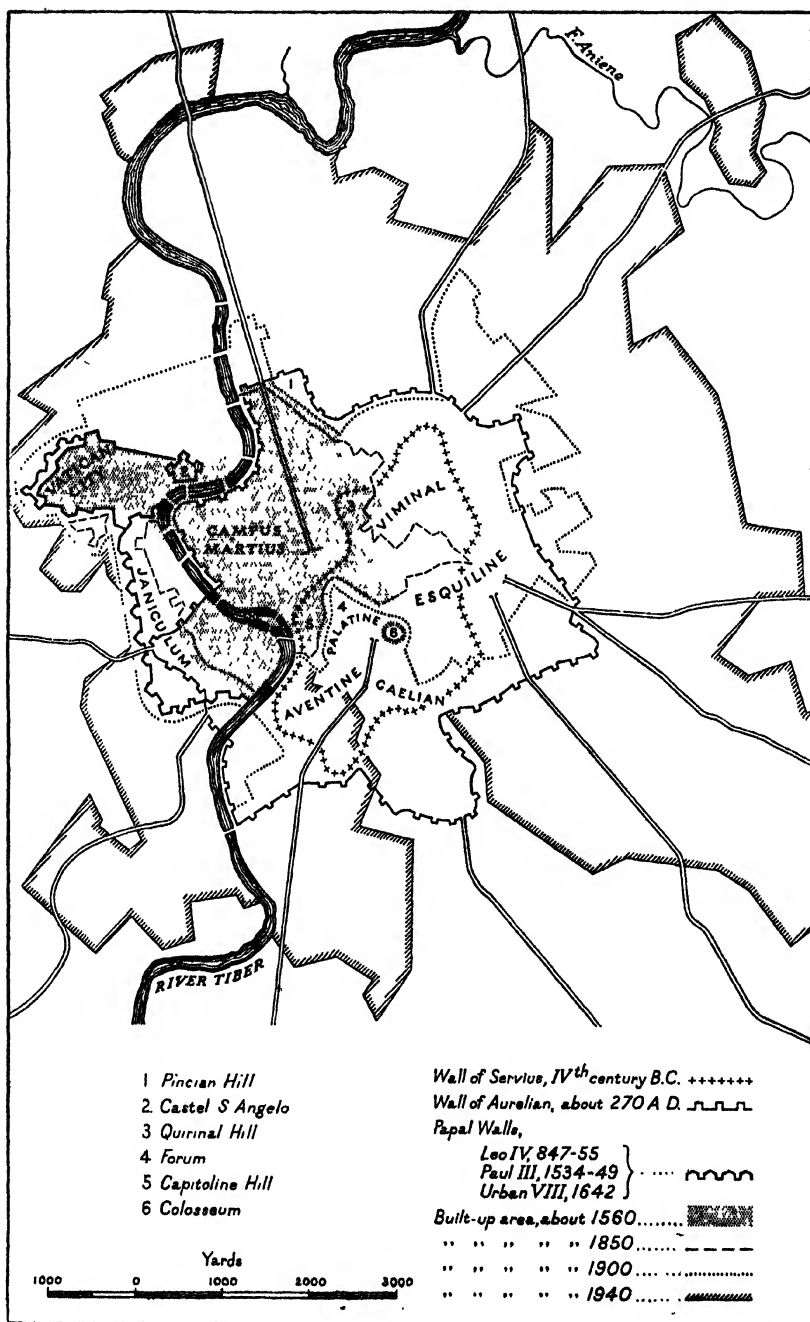


FIG. 6. Stages in the growth of Rome

occupied the Palatine (Roma Quadrata; 167 ft.) and Capitoline (194 ft.) hills which are nearest to the crossing on the east bank. The forum in the space (*c.* 53 ft.) between them became the centre of the city, which next extended south over the Aventine hill and east to the Esquiline and Caelian hills. The wall ascribed to Servius Tullius (579–535 B.C.) enclosed this area together with the Viminal and Quirinal hills to the north, hitherto the site of a Sabine settlement. Under the Republic (510 B.C.–27 B.C.) the city boundaries extended rapidly beyond this wall, and under Augustus they spread north beside the river over the low-lying area of the Campus Martius and the slopes of the Pincius (213 ft.). Augustus divided the city into fourteen districts covering an area which corresponded roughly with the built-up limits of the city at the end of the last century. The extent of Rome by the end of the third century A.D. is indicated roughly by the Aurelian wall which spread across the river to include a citadel on the Janiculum (289 ft.) and an area corresponding to the modern Trastevere.

Owing to the deterioration of the Campagna following the end of the Roman Empire, the medieval city did not occupy all the area within the Aurelian wall, and was mainly restricted to the northern part of ancient Rome, the Campus Martius, and the hills to its north-east. This is still the most densely peopled quarter, and apart from a few wide modern thoroughfares retains its ancient characteristic network of narrow streets. Such expansion as took place was west of the Tiber on the slopes of M. Vaticano (263 ft.) around the church of St. Peter and the Castel S. Angelo. This part of the city opposite the Campus Martius continued to grow and by the seventeenth century was surrounded by the wall of Urban VIII, which included the whole of the Janiculum hill as well as the Vatican quarter and Trastevere.

During the nineteenth and twentieth centuries Rome expanded beyond its ancient limits, chiefly northwards beside the Tiber to the Mi. Parioli (213 ft.), along the Aniene and beyond it to the suburb of Monte Sacro (128 ft.). Towards the south, expansion has been mainly along both banks of the Tiber and to the south-east near the railways. West of the river an extensive suburb has been built over the low-lying district north of the Vatican between the river and M. Mario (456 ft.).

History

Rome in the course of her long history has been the capital of the Roman Empire, the seat of the Papacy, and the capital of the Italian

kingdom. The Empire, however, sprang from the Republic, and the claim of the people of Rome to be the depositaries of sovereign power persisted through the Middle Ages down to modern times. The Romans looked back to the Republic as to a Golden Age, and, on the strength of their past, maintained their right to rule not only their city but the world.

Ancient Rome. The history of the origin of the city is conjectural and is based on myth and tradition in which there is probably a core of truth. One story attributes the origin of the Roman people to Aeneas, who, after the siege of Troy, came to Latium and married the daughter of King Latinus. Here, in their capital Alba Longa (possibly built on the site of Castel Gandolfo), his descendants ruled until Romulus abandoned Alba and founded a settlement on the Palatine hill. This early settlement gradually expanded on to the seven hills which were surrounded by one wall. Romulus was succeeded by Numa, Tullus Hostilius, and Ancus Marcius. Then a new reigning family arose, the Tarquins, who, following a revolution fermented by their pride and cruelty, were expelled in 510 B.C. Their flight left a permanent prejudice in the Roman mind and the title 'King' was never afterwards used. It is generally accepted to-day that the reign of the Tarquins represents the conquest of Rome by the Etruscans, who occupied a large area north of Rome, including modern Tuscany. Etruscan influence was deeply impressed on Roman religion, especially in the science of divination, and in the forms of government, notably in the curule chair and the rods and axes of the lictors (fasces).

The Kings. At the head of the constitution of early Rome was the King (rex) elected by the Council of Elders (patres) or Senate, and presented by them to the *populus Romanus* for acceptance. The king was the leader in war, the supreme judge, the author of taxation, and took the auspices on occasions of national importance. The Senate was at first selected by the curiae to assist the king, but in time became an hereditary aristocracy of patricians, vacancies in whose ranks were filled by the king. The *populus Romanus*, who formed the keystone in the primitive political system and probably consisted of all the freemen of the city, was divided into three tribes and thirty curiae. The people voted in the Assembly of the curiae which met in the forum.

The Republic. The republican form of government lasted almost five hundred years from 510 B.C. to 27 B.C. when Augustus became the first emperor (imperator). During this period Rome expanded

from a small hill-fortress state hemmed in by hostile tribes to an empire which stretched from the coast of France or Gaul to the banks of the Euphrates. Internally, its story is that of the development of republican government, the long constitutional struggle between the plebs and the patricians, the gradual collapse of the Republic under the increasing burden of empire, and the final establishment of imperial rule.

When the Republic was first established the territory of Rome extended some 12 miles north and the same distance south of the Tiber and westward to the mouth of the river at the port of Ostia. During the first period of the Republic, up to 265 B.C., Rome conquered Italy from the region of the Po to Calabria. At first Rome did not deliberately set out to conquer the neighbouring tribes, but various events forced this on her. The incursion of the Gauls into peninsular Italy and their sack of Rome in 390 B.C. had a profound effect. Only a force on the Capitol hill held out until the Gauls withdrew. Rome was badly pillaged and there was talk of evacuating the population to Veii. Camillus, now an almost legendary figure who saved the Romans from complete defeat, prevented this move and the break with old traditions which it would have involved. He also helped to restore internal order and to maintain the standards of Roman morality. In these early years of the Republic, Romans, even the patricians, lived a simple, frugal life, many still working on the land, whilst all seem to have obeyed a strict moral code. This era was always looked back upon as the Golden Age of the Republic.

During the conquest of Italy the Roman republican constitution was being shaped. The supreme authority, which had previously been vested in the king for life, was now transferred to two magistrates, called, it appears, consuls (*praetores consules*), who were elected annually by their classes and centuries in an assembly. Each consul singly exercised all the prerogatives of the king except during times of particular danger when their powers were vested in a dictator. No formal change was made in the position and powers of the Senate. The struggle between the patricians and plebeians began with the establishment of the republican constitution. The patricians and plebeians were both equally citizens of Rome with civil rights, but only the patricians could sit in the council of *patres* and hold the higher positions of State. The patricians, therefore, had an overwhelming supremacy in the government. Even though the ranks of the plebeians were gradually swelled when the Latins were conquered, they commanded only a minority of votes in the Assembly, were

limited in their choice of magistrates to patrician candidates, and could only vote on laws proposed by the patrician consuls. The greatest concern of the plebeian, however, was that he had no protection or appeal against the power of the consuls. The first victory of the plebeians was in the early years of the Republic, when the passage of the Valerian law forbade the execution of a death sentence on a Roman plebeian without the sanction of the Assembly of the centuries. Vigorous action of a body of legionaries led to the next step, the appointment of plebeian Tribunes (*tribuni plebis*; first 2, then 5, later 10 in number). These magistrates served for a year and safeguarded the interests of the plebeians against the power of the two patrician consuls. The tribunes convened the assemblies of the plebs and also acted as the leaders as well as the protectors of the people. Next came the demand for a written law and the issue of the Twelve Tables (452 B.C.). Under the *Lex Liciniae Sextiae* (387 B.C.) a plebeian could be a consul. The first plebeian consul was created in 367 B.C., whilst in 356 B.C. there was a plebeian dictator. Finally in 287 B.C. laws passed by the plebeians in their Assembly (*concilium plebis*) were given full recognition, and their independence was thus assured. So the struggle between the patricians and the plebeians terminated without bloodshed, but the separate organizations of the plebeians remained.

The completion of the conquest of Italy was at once followed by the Punic Wars which were fought against Carthage and lasted from 264 to 146 B.C. The Romans in the First Punic War captured Sicily and in the third gained control of north Africa. During the Second Punic War Hannibal invaded Italy and conquered the greater part of it. Rome was in considerable danger as Hannibal came within 3 miles of the city, but, as ever, the Romans, when they seemed utterly defeated, fought their best and Hannibal was eventually forced to leave Italy.

The Punic Wars had a profound effect upon Rome, as her new possessions made her an imperial power. The second period of the Republic (265–133 B.C.) was a phase of political deterioration. Rome came in contact with the Phoenician and Greek civilizations and had to play a part in international affairs. The city itself was now not only the capital of Italy but the centre of an empire. Her citizens learnt the value of money, art, and philosophy, and began to lose their simplicity of living. Furthermore, the number of Roman citizens had been seriously depleted by the wars, and foreigners, particularly Greeks, began to settle in Rome. The Roman constitu-

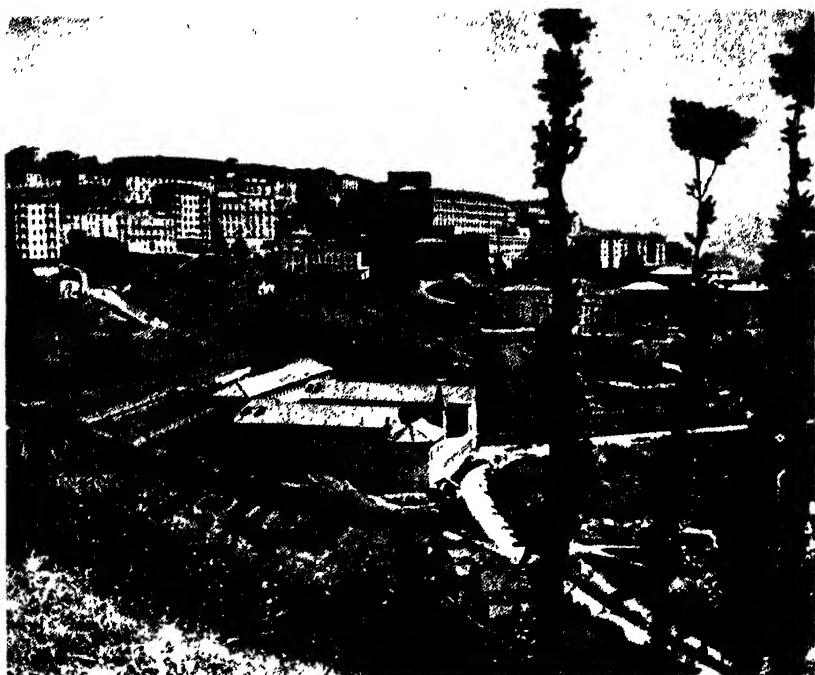


PLATE 16. *Potenza*



PLATE 17. *Rome: a typical Piazza, the Piazza Esdra*

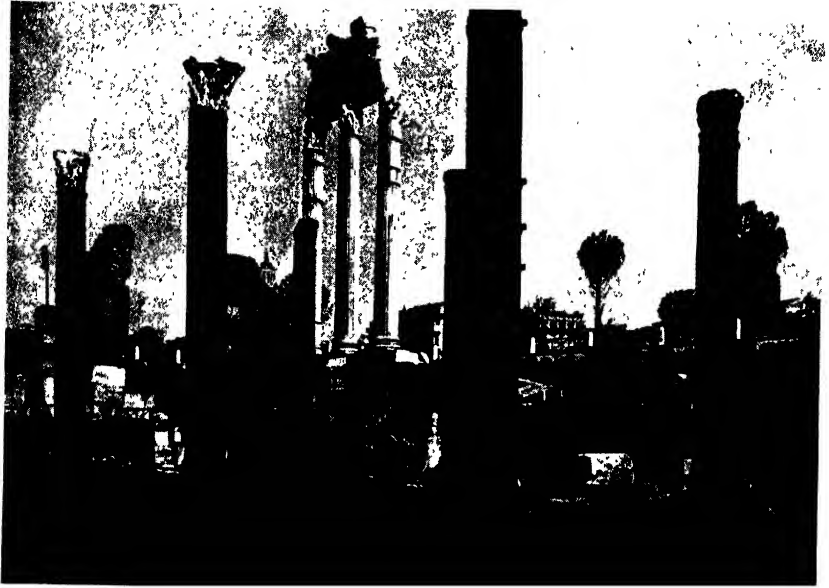


PLATE 18. *Rome: the Forum of Julius Caesar*



PLATE 19. *Rome: the Via del Circo Massimo and the palace of Septimius Severus*

tion, which was fitted for a small city-state, was naturally unsuitable for the government of Italy and an empire. During this period the Roman constitution changed little outwardly, but in reality the sovereign authority in Rome was vested in the Senate which was controlled by an order of nobles. The privileges enjoyed by the Senate were as great as those of the patricians had been. It became understood that no magistrate should bring a proposal before the Assembly except by the direction of the Senate. It controlled foreign policy, finance, supplies, and domestic administration. The members of the Senate were elected by the consuls, but their choice was limited to the official class drawn from those who had held the magistracy. The ascendancy of the Senate was acquired at the cost of the popular assembly (*comitia* of the *populus*) and the executive magistracy (*concilium* of the *plebs*), both of which could only be convened by a magistrate.

The Punic Wars and the later wars, which involved the conquest of the Mediterranean basin, brought great wealth to Italy. The Senators, debarred from commerce, became great landowners. By adopting from Carthage the system of slave labour and a policy of buying out the small landowners, they ran their estates at a large profit. This policy created a dispossessed class many of whom flocked to Rome. Beside the senatorial magnates the wars produced a new class or order of 'self-made' business men, army-contractors, slave dealers, money-lenders, and speculators, who exploited the newly annexed countries. This new capitalist class was to become a lesser nobility, and were eventually known as the Equestrian Order (*Equites*) or Knights. Another effective channel for the increase of wealth was the provincial governorships, but these were limited to the senatorial nobility. In contrast to this concentration of power and riches, a third order, 'the populace of Rome', represented an ever growing proletariat of the idle and inefficient. These formed the bulk of the voters in the Assembly and to win their support it was essential for promising politicians to humour them. To do this all types of bribery were employed; corn was sold at half price, and shows and spectacles provided. Though the amphitheatres were of later date, gladiatorial combats between slaves were held. All these corruptive tendencies steadily increased as riches grew, and bribery became an accepted political weapon. The slave basis of society intensified unemployment, while the Roman mob, growing more exacting with the success of threats and violence, undermined the power of the Senate and opened the road to permanent dictatorship. Another disrupting

force was the new learning from Greece which brought with it the desire for liberty to 'live as one likes'. This view of life, together with oriental ideas and luxurious living brought from Asia Minor, gradually put an end to the Spartan mode of life and narrowness of views typical of the early republic.

From 133 to 81 B.C. a constant controversy was waged between the Senate and the Assembly. The chief aim of the popular leaders was to reassert the independence of the Assembly. The first systematic attack upon the senatorial government is connected with the names of Tiberius and Gaius Gracchus, both of whom died violent deaths trying to achieve their aims. This was the first time a constitutional question was settled by force and bloodshed. Gaius Marius, a soldier of lowly origin who defeated Jugurtha of Numidia and drove the Cimbri and Teutones from the gates of Italy, took up the cause of the popular party, but was not much more successful than the Gracchi. However, he was the first of a long series of generals to control the State. The next was Lucius Cornelius Sulla, who was a member of the Senate. He came to the fore when the Italians who had shared the perils and victories of the Romans demanded equal citizenship with them. The Italians revolted when this was refused and the ensuing Social War lasted from 90 to 88 B.C. In the end the Italians were enfranchised and entered as municipalities within the pale of the Roman State. Much discontent and strife still lingered in Rome and was only terminated in 83 B.C., when Sulla with his legions marched on the city and gave the Senate complete authority over the Assembly. Sulla, who had been victorious in the East, had trained a magnificent army, with which he had been able to defeat all his rivals in Italy. He was appointed dictator, and reigned supreme in Rome. An orgy of murder and proscription, famous throughout history, followed. When order was completely restored and the Senate's position secure, Sulla laid down his personal dictatorship. He had demonstrated the weakness of the Republic, which was unable to cope with an Empire or to stand up against a successful general with a loyal army at his back.

Sulla died in 78 B.C., but the revised constitution he left behind him lasted for nine years. It was overthrown by another successful soldier Gnaeus Pompeius (Pompey). Republican Rome now enters on its final phase. The three political parties still remained, the Senatorial, the Equestrian, and the Democrats, supported by the Roman mob. Pompey, who was a great and successful general, was only interested in politics in so far as they led to important military

commands. As the Senate did not give him what he wanted, he supported the popular party, which was instrumental in obtaining for him the command against the Sicilian pirates and the conduct of the Mithradatic war in Asia. His campaigns were highly successful and lasted from 67 to 62 B.C. The period was marked in Rome by the rise of Caesar and Cicero to political power and by Cataline's attempt at revolution, which brought discredit on the popular party. Caesar, aided by Crassus, the wealthiest man in Rome, was able to buy the support of the people with whom he was popular. Cicero was the leader of the moderate party of the middle-class Italians. The moderate party in Rome generally met with little support as the citizens, like their Italian descendants, only favoured extremes. Caesar, between 60 and 51 B.C., conducted highly successful campaigns first in Spain and then in his province of the two Gauls. In Rome the course of events and Caesar's successes forced Pompey into alliance with the Senate against Caesar. Crassus, Caesar's supporter, in the meanwhile, had been killed in the East. Such a state of anarchy prevailed in the city that the Senate, which had revealed its own inability to keep order, was forced to appoint Pompey sole consul (52 B.C.) to put down violence. In 50 B.C. Caesar, seeing his cause going from bad to worse, crossed the Rubicon, which was the boundary of his province, and marched with part of his army on Rome. Pompey fled from Italy and gathered together a large force in Greece. Caesar followed with a small and less well equipped force with which, owing to an ingenious strategy, he utterly defeated Pompey at Pharsalus (49 B.C.). On his final return to Rome in 45 B.C. Caesar was appointed dictator for ten years.

During his sojourns in Rome between campaigns Caesar had already begun the reorganization of the Empire on his own lines; he now proceeded to develop it. He enlarged the Senate, but bitterly injured its pride by introducing his centurions and even Gauls as members. He designed the Senate to supply the provincial administrations in its higher ranks and the Equestrian Order to fill the civil service and subordinate posts. But in all he did he made it clear that the old republican forms had gone, and that the Empire was now under a single head. He accepted the titles of Augustus and Imperator and settled important questions without even consulting the Senate. He took no steps for his personal safety, trusting the men who owed their lives to his clemency. The result was his assassination in 44 B.C., the year after his return from Spain.

The death of Caesar left Mark Antony the first person in the State

and also brought to the front the young Octavian, Caesar's grand-nephew and heir. These two, though rivals, formed a triumvirate with the consul Lepidus, and divided the Empire between them. They began with an outburst of murder and proscriptions of which the most famous victim was Cicero. Lepidus soon disappeared from the scene, and Antony, after failures in the East, was defeated in battle by his old ally Octavian, into whose hands the Empire passed without dispute.

Rome under the Empire. Octavian accepted the title of 'Augustus', under which name he is known and which hereafter became the formal title of his successors. Though in theory he was but the first of citizens, he held, in substance, absolute power. As Pontifex Maximus he was the head of the state religion, whilst the Tribunicia Potestas made him *princeps* in Italy, and the Proconsulare Imperium gave him the mastery of the provinces. To the Senate he showed great respect and in theory they stood side by side with parallel powers. Though he reduced its numbers he observed its traditions, restricting its membership to Romans of noble birth. Rome herself came in for careful organization. He instituted a system of police, a fire service, a service for the care of the water-supply, and an organization for the repair of buildings. Another official had charge of the cheap corn supply, the recipients of which Augustus increased in number from 150,000 to 200,000. He was the first of the great builders. It was said of him that he 'found Rome brick and left it marble'. He restored the temples and built new ones and encouraged the wealthy citizens to follow his example. His friend and intimate, Agrippa, was responsible for the Pantheon. Though Rome was not yet the imposing city of later times it was rapidly developing into a worthy imperial capital. At this date, however, the houses and often the temples were built mainly of wood and brick, and the most imposing monuments were spoils from Greece. Even the houses of the wealthy were only of two stories.

Rome as the capital of a vast Empire was rapidly becoming a cosmopolitan city and an important commercial centre. Trade brought all types and nationalities from the east; there were slaves from all nations, whilst the soldiers retired to Rome from every part of the known world. Such a mixture of nations, with varying standards of morality, destroyed all remnants of republican austerity. The exotic mystery religions of the East, such as the cult of Isis and of Mithras, lowered the standards of behaviour, whilst luxurious living conditions softened the nobility and caused a decline in the birth-rate.

The baths, the clubs of the day, played a large part in the life of the nobility, the magnificent banquets had every possible refinement of debauchery. The Emperor overawed the populace by a standing army and provided them with lavish amusements. The shows in the theatres and circuses became more spectacular and more bloody. The throwing of Christians to the lions became an added attraction on Roman holidays.

The emperors after Augustus until the death of Nero were hereditary, but from thenceforth they were mainly created by adoption. They gradually developed an elaborate, almost eastern, court and built magnificent baths (e.g. the baths of Caracalla), triumphal arches (e.g. that of Titus), forums or market places (e.g. that of Trajan), temples, and palaces, of which perhaps the golden house of Nero was most famous. Much of the show and splendour affected by the emperors was in part necessary to appeal to their eastern subjects who expected great rulers to live in magnificence.

Under the emperors the government became a bureaucracy dependent on the individual emperors and the administrators of their choice. This central imperial ministry was vitally important, and eventually the Empire was virtually run by it. Rome was, as it were, the centre of a vast spider's web, from which the threads of government were spun. The Senate became powerless and inefficient when given power. The emperor, indeed, became the hub of the Empire. By the time of Hadrian (A.D. 117-138) an 'imperial council' had come into being and this assisted the emperor in the government. The council, which in the fourth and fifth centuries was known as the 'sacred consistory', generally contained the emperor's personal friends and professional lawyers. Diocletian (A.D. 284-305) was an autocrat in theory as well as practice, and had absolute authority throughout the Empire. The last lingering traces of republican government disappeared in his reign. Under Diocletian, moreover, Rome suffered her first serious loss of prestige. For nearly three centuries Rome had been the imperial city and the centre of the Empire's activities. Now the association of a second 'Augustus', Maximian, and the nomination of two subordinate 'Caesars', Galerius and Constantine, together with the choice of Mediolanum (Milan), Sirmium (Semlin; at the junction of the Save with the Danube), Augusta Trevisarum (Trier), and Nicomedia, on the Bosphorus, as their domiciles, left Rome a provincial city.

After a period of confusion following the death of Diocletian the Empire was once more united under Constantine the Great

(A.D. 324–337). Constantine entered Rome in A.D. 312 as sole master of the Empire. He remained for a short time and only visited the city twice afterwards. The two outstanding events of his reign, the recognition of Christianity as the religion of the Empire and the foundation of his new capital, Constantinople, had a profound effect on Rome. The city, though it retained its consuls, Senate, and curiae which were mere shadows of their previous forms, was administered by a prefect of the city and the Vicar of Rome. The latter was under the jurisdiction of the prefect of Italy, and not that of the city. The praetorian guards were disbanded and Rome was left undefended. Her pre-eminence was at least temporarily eclipsed, although she was still venerated for her glorious past.

The imperial unity established by Constantine lasted but half a century. In 366 Valentinian divided the Empire, entrusting the east to his brother Valens. Rome remained a provincial city, for Milan was a better centre for watching the frontiers. The last quarter of the century saw the overthrow of paganism. The moving spirit, however, was not the Bishop of Rome, but Ambrose, the great Archbishop of Milan. Rome was still pagan, but with the destruction of temples and the uprooting of the old faith, the city became the centre of Western Christianity. The Pope gradually assumed the leadership of the Western Church and eventually of the government of Rome.

During the reign of the western Emperor Honorius (A.D. 395–423) the barbarian invasions began. In A.D. 400 Alaric and the Goths invaded Italy, but were driven back. Honorius and his generals held a triumph in Rome, and the games which followed were the last in which gladiatorial combats took place. At this date Rome had a population of over a million inhabitants and was confined within a perimeter of some 20 miles. The city was besieged by Alaric in 409 and, in the following year, was sacked by him. For the first time for over six hundred years the city lay at the mercy of a conqueror. Twice more, before the century closed, Rome experienced the horrors of a savage conqueror. In 455 Genseric, King of the Vandals, landed at Ostia from his African Empire and sacked the imperial city with even greater thoroughness than Alaric and the Goths. In 472 a disputed succession to the Western Empire between Anthemius and the candidate put forward by the King of the Goths ended in the seizure of Rome by the latter. Four years later (476) the Western Empire came to an end with the triumph of Odoacer and the deposition of Augustulus, the last Western Emperor.

Papal Rome. The document known as the Donation of Constantine takes the form of a deed of gift by which the Emperor, before his departure to Constantinople, transferred to Pope Sylvester and his successors the Lateran Palace, the city of Rome, and all the provinces and cities of Italy. On the ground that it was not right that an earthly emperor should exercise authority where the head of Christendom had his seat, the Pope was accorded all outward signs of imperial dignity and the Roman clergy were given the rank of Senators. It has long been recognized that the document is a forgery, perpetrated more than four hundred years after Constantine's day. The transference of the capital of the Empire to the east did, however, mark the beginning of a process which established the popes as temporal lords of Rome. In the second half of the eighth century, when the document made its appearance in the papal chancery, the position of the Pope in Rome was such as to warrant his claim to have succeeded to the imperial authority. The Empire had been weakened by quarrels between rival Caesars, and the emperors of the West, striving to stem the tide of barbarian invasion, had made Milan or Ravenna their headquarters. Thus the care and protection of Rome fell to the popes. When Alaric the Goth seized and sacked the city in 410, Pope Innocent I was the only potentate whom he found there, and he is said to have spared the churches at Innocent's prayer. In 452, when Attila and his Huns were preparing to march on Rome, Leo I appeared at his camp on the Mincio and persuaded him to leave Italy. Attila's death in the following year enhanced the effect of the pope's intervention.

After the fall of the Western Empire, in 476, the popes became the natural agents of imperial administration in Rome. They made themselves responsible for feeding the people in time of famine, for the maintenance of public buildings, and the payment of the soldiers. The pontificate of Gregory the Great (590-604), in particular, saw a great development of papal authority in temporal affairs. Gregory was the son of a Roman noble and had himself held the office of prefect. As pope, he founded hospitals, instituted a regular system of poor relief, and bought off the Lombard King Agilulf when he threatened the city. Among the churches which he built was one on the site of his father's house on the Caelian Hill, dedicated to S. Andrew and afterwards renamed in his honour S. Gregorio Magno. Gregory set himself to evangelize the Lombards, and the inclusion of the barbarians within the fold of the Church added to the prestige of the Papacy. The final emancipation of Rome from the control of

the Eastern Emperors was achieved when all Italy, led by the Pope, defied Leo the Isaurian's edict for the destruction of images (726). Papal sovereignty over the city was now an accepted fact, but already the power of the Roman nobility constituted a threat to papal authority. For the defence of the city the nobles were organized in a military force under a duke on the Lombard model, and the army came to stand for the aspirations of the citizens for self-government. Thus, unrest in Rome, together with the dangers involved in the growing power of the Lombard kings, caused the popes to seek a new protector. In 753 Pope Stephen II crossed the Alps to ask aid of the Franks; Pepin took upon himself 'the cause of St. Peter and the republic of the Romans', and within the next twenty years he and his son Charlemagne completed the overthrow of the Lombard kingdom.

The donations of Pepin and Charlemagne placed the popes in possession of wide dominions, but the problem of their administration intensified the quarrels between the military and clerical parties in Rome. Leo III was forced to take refuge from his rebellious subjects at the Frankish court before he found a solution of his difficulties in a revival of the imperial power. On Christmas Day 800, Leo, as the Vicar of Christ and the representative of the Roman people, crowned Charlemagne as Emperor in the basilica of St. Peter's. The differentiation of function between Pope and Emperor which Leo III envisaged is seen in the mosaics with which he decorated his banqueting-hall in the Lateran palace. Here St. Peter gives the pallium, or badge of ecclesiastical supremacy, to Leo, and to Charlemagne the standard of the Christian army. Charlemagne made his authority effective in Rome as throughout his Empire, but after his death the government and defence of the city fell again for the most part to the popes. Leo IV (848-852) fortified the district called the Borgo, on the right bank of the Tiber where stood the basilica of St. Peter, as a protection against the Saracens; it became known later as the Leonine city. The immediate threat to Rome was removed by the naval victory over the Saracens at Ostia (849), for which the chief credit belongs to Leo IV.

The next two centuries were a period of confusion and degradation in Rome. The Emperor Lothair's *Constitutio Romana* (824), promulgated in an attempt to strengthen his control over the city, increased the power of the lay nobility and successive popes became the victims of their aggressions. Local tyrants arose from among the nobles, of whom the first was Theophylact (900), who, as president of the

Senate, controlled the secular government and nominated popes at his will. His daughter, Marozia, was known to be the mistress of Pope Sergius III, and in 931 she secured the election of her son as Pope John XI. Another son ruled Rome for twenty years, calling himself Alberic, Prince and Senator. Alberic's son Octavian, a vicious and illiterate youth, succeeded to his power, and in 955 was elected pope as John XII. In response to his appeal for aid, the Emperor Otto I came to Rome and promptly deposed him, but the intermittent interventions of German monarchs could not crush the power of the Roman nobles. Soon a new family of tyrants—the Crescentii—ruled the city, one of whom threw Pope Benedict VI, the Emperor's nominee, into the castle of S. Angelo and strangled him. The boy Emperor Otto III, supported by the German Bruno and the French scholar Gerbert of Aurillac, who in turn became pope, struggled to revive the imperial tradition. He built himself a palace on the Aventine and commanded the palatine judges to enforce the Roman law, yet he failed to subdue the Roman people. Rising in revolt, they besieged their emperor in his palace and forced him to leave Rome (1001).

The reform movement of the eleventh century raised the Papacy from the local despotism it was fast becoming to the spiritual leadership of Christendom. The reform which contributed most to this result was the Decree of 1059 placing the election of the popes in the hands of the cardinal-bishops. Hitherto the electors had been 'the whole clergy and nobility of the Roman people', a provision which left ample room for the intrigues of ambitious nobles and imperial pressure. The decree was not strictly kept, but it was the first step towards the emancipation of the Papacy from lay control and the establishment of the College of Cardinals, as the sole electoral body. The leader of the reform movement was Hildebrand, who during a youth spent in Rome had seen the Papacy in its degradation, and who as Archdeacon of Rome (1059) held an important administrative position in the city. His election as Pope Gregory VII (1073) was pressed on the cardinals by an enthusiastic crowd of Roman citizens. The long struggle between Pope and Emperor, while it vindicated the spiritual independence of the Church, brought much suffering upon Rome. Henry IV besieged the city three times and finally entered in triumph in 1084 to be crowned Emperor by the anti-pope. In 1085 the sack of Rome by Gregory VII's Norman allies outdid the destruction caused by Goths and Vandals in former days.

In Rome, as in other Italian cities, the effect of the investiture

controversy was to stimulate the communal movement. While the great noble families split into imperial and papal factions, the lesser nobility made common cause with the people. In 1143 they proclaimed a republic, and set up a senate from which almost all the greater nobles were excluded. They found an exponent of their ideals in Arnold of Brescia, who, with equal fervour, preached the sovereignty of the people in accordance with ancient Roman tradition, and denounced the wealth and power of the clergy as contrary to the standard of the Gospel. Under his leadership the Romans fortified the Capitol and set up a citizen army in imitation of the Lombard communes. The Roman Republic threatened the authority of both Pope and Emperor, and the two made friends against their common enemy. Pope Hadrian IV put Rome under an interdict which was only removed on Arnold's banishment. Arnold fell into the hands of Frederick Barbarossa, who had come to Italy to vindicate his rights, and was persuaded to hand over the republican champion to the Pope. In 1154 Arnold was burned at the stake, his ashes being flung into the Tiber, and in the following year Hadrian IV crowned Frederick as emperor in St. Peter's.

Fierce fighting between Romans and Germans broke out immediately after the coronation, and soon Pope and Emperor were engaged in a fresh conflict, in the course of which Frederick entered Rome as a conqueror (1167). In 1188, after the popes had shared in the triumph of the Lombard communes, Clement III recognized the Roman Republic, the Senate and people on their side agreeing to take an oath of fidelity to the Pope as their suzerain. Rome, however, was not favourable soil for the establishment of a stable communal government. It had no powerful trading class such as formed the mainstay of the commune in other Italian cities. The feudal nobility with large estates outside Rome, palaces within it, and representation in the College of Cardinals, dominated the situation and kept the city in a turmoil by their feuds. Every building was fortified, and Rome was said to have no less than nine hundred towers. By the end of the twelfth century the great houses of Orsini and Colonna had risen into prominence. Innocent III (1198-1216), one of the greatest of medieval popes, belonged to the Conti family, bitter rivals of the Orsini, whose opposition effectively prevented him from mastering Rome. He made the Prefect of Rome, hitherto a vassal of the Empire, take an oath of allegiance to himself, and he placed justice in the hands of papal officers, but the control which he secured over the Senate was only temporary. Opposition to him became so strong

that he had to leave the city for a year; his powerlessness in Rome contrasted strangely with the influence which he exercised throughout the Church.

During the thirteenth century the Roman nobles were divided between the Guelf and Ghibelline factions, but their object was to prevent either Pope or Emperor from becoming supreme in Rome, and they used the party names to further their own quarrels and ambitions. In 1252 the people, wearied of the anarchy of the nobles, adopted the expedient familiar in other Italian cities, and called in a podestà to rule over them. This was Brancalone degli Andalò of Bologna, who received the Roman title of Senator and by stern justice succeeded in establishing peace and order. As a Ghibelline, Brancalone was unacceptable to the popes, and in 1255 Alexander IV succeeded in engineering his banishment. He was brought back two years later, when Manfred of Hohenstaufen rallied the Ghibelline forces, and ruled as strongly as ever till his death. In 1261 Manfred was himself made Senator of Rome, and in 1265 his rival Charles of Anjou succeeded him in that office. There were in all eighteen popes in the course of the century, and of these no less than eleven died away from Rome. Each was dependent on the support of some powerful Roman family, or of the Angevin princes they had brought into Italy. When this failed them, they found themselves in exile. Despite civic unrest, thirteenth-century Rome was not devoid of artistic and intellectual progress. The beautiful cloisters of S. Giovanni in Laterano and S. Paolo fuori le Mura both belong to the first half of the century, and Nicholas IV (1288–1292) made the Lateran Church a fitting symbol of papal grandeur. Innocent IV founded the University of the Roman Curia in 1245, and Boniface VIII that of the city of Rome in 1303. These became merged in a single Roman University in the sixteenth century. Boniface VIII was the last of the medieval popes. The Empire had now ceased to exist as an Italian power, and Boniface could claim that he was both Pope and Emperor. In 1300 he held the first papal Jubilee, and the crowds described by Dante as crossing the bridge of S. Angelo on their way to and from St. Peter's bore witness to the world-wide supremacy of the Papacy. Boniface, however, was a Gaetani, a Roman family jealous of the greater wealth of the Colonna. The enmity which he aroused by his destruction of the Colonna fortress of Palestrina and other acts of aggression made the Colonna his implacable foes. They joined hands with the enemies, both within and without Italy, which Boniface had made by his pretensions to world-wide supremacy, and

in 1303 Sciarra Colonna, assisted by French agents, took the Pope prisoner at Anagni. His refusal to resign the Papacy, and popular indignation at the outrage caused his release. An escort sent by the senators brought him back to Rome, but he returned only to die.

In 1305 a Frenchman, Bertrand de Got, was elected pope, and the seat of the Papacy was transferred to Avignon. In the course of the century three emperors came to Rome to be crowned, but none succeeded in establishing their authority in the capital. Henry VII was crowned by the Pope's delegates in the Lateran Church (1312), his enemies being in possession of St. Peter's. Louis IV came to Rome (1328) as the open enemy of the pope. He was elected Roman Emperor by a popular assembly on the Capitol and received the imperial crown from Sciarra Colonna, acting as the representative of the Roman people, but shortly after these solemnities he was driven from Rome by the Orsini. Innocent VI made it a condition of Charles IV's coronation (1355) that he should not spend a night in the city. Both the papal and the imperial power being in abeyance, new experiments were made in republican rule. Various constitutions were drawn up, all of which aimed at the establishment of a government resting on the people, the restoration of order by means of a citizen army, and the curbing of the power of the nobility. Of these experiments the most outstanding is that associated with the name of Cola di Rienzi. Rienzi's articles of faith were the sovereignty of the Roman people and the right of all Italians to the privileges of Roman citizenship. His aim was to make the Roman Republic the focus of Italian unity. In 1347 he was proclaimed Tribune of the People, and went through fantastic rites of knighthood and coronation. For the time being he was master of Rome, but his pretensions alarmed the Pope, who sent a legate with orders to release all Romans from their allegiance to the Tribune. The nobles, many of whom he had killed, banished, or imprisoned, at once turned against him, and realizing that his authority was slipping from him, he fled from the city (1348). In 1354 he was back in Rome with the title of Senator, granted him by Innocent VI, who saw in him an instrument for the revival of papal power. His rule on his return was marked by acts of tyranny which contrasted with the strict justice of the Tribune, and public opinion turned against him. The mob attacked the capitol and Rienzi was killed, being last seen pointing to the letters S.P.Q.R. (*Senatus Populusque Romanus*) on the banner of Rome.

The residence of the popes at Avignon brought home to the people of Rome how much the wealth and prestige of the city depended on



PLATE 20. *Rome: the Victor Emmanuel monument and the Colosseum*



PLATE 21.* Rome: St. Peter's and the Vatican city

the presence of the papal Curia. Embassies were sent to Avignon urging the Pope's return and these were enforced by pressing letters from Petrarch. In 1367 Urban V entered Rome, where he was visited in the following year by Charles IV, and Rome rejoiced at having the two heads of the world once more within her walls. Friction soon arose over the pope's claim to appoint the senator and, in 1370, Urban returned to Avignon. In 1378 Gregory XI, brought back to Rome by St. Catherine of Siena, died not long after his arrival, and the Cardinals who had accompanied him elected Urban VI as his successor. The Cardinals who had remained at Avignon declared the election void and elected Robert of Geneva with the title of Clement VII. Thus Europe was plunged into the Great Schism, and the French garrison in the castle of S. Angelo refused to yield the fortress to Urban VI. The defeat of French troops, trying to revictual the garrison, by Alberico da Barbiano and his Italian company, in 1379, led to the surrender of the fortress, and was hailed as a triumph for native arms. From this time the popes steadily increased their authority at the expense of the republic. The Romans could not do without the Pope and they sacrificed their liberties to retain him. In 1393 the Pope's right to appoint the senator was conceded and the *banderesi*, or citizen army was disbanded. The Schism, which in 1409 became triple, was the cause of further disturbances in Rome and gave encouragement to ambitious neighbours such as Ladislas of Naples and the condottieri. But here, as in the rest of Italy, the age of the commune was passing and giving place to that of the despot.

The entry of Pope Martin V into Rome in September 1420 opens a new era in Roman history. Martin found the city in ruins and the people starving. As a Colonna he wished to restore his native city to its former glory, so he rebuilt churches, repaired roads, put down robbery, and drastically reduced the price of corn. He and his successors aimed at making Rome a capital worthy of the head of Christendom, and each pontificate added to its beauties. Nicholas V brought water to the city by means of an aqueduct and the original Fontana di Trevi—most famous of Roman fountains—was built for him by Leon Battista Alberti. The Lateran palace had become uninhabitable during the absence of the Pope, and the Vatican was now the papal residence. In 1450 Nicholas V began the work which was to transform it into the splendid palace it is to-day. Sixtus IV, in 1473, added the chapel which bears his name. Innocent VIII built the pavilion in the Vatican gardens known as the Belvedere,

which Bramante, under Julius II (1503-1513), connected with the main building by two long galleries. Some of the greatest Italian artists of the period contributed to the decoration of the interior. Meanwhile Cardinals built palaces for themselves, among which the most noteworthy are the Palazzo Venezia, built for Pietro Barbo (afterwards Pope Paul II) in 1455, the magnificent fifteenth-century Palazzo della Cancelleria built for Cardinal Raffaele Riario, and the Palazzo Farnese built by Sangallo in the sixteenth century for the future Pope Paul III. This orgy of building reached its climax under Julius II (1503-1513), who made the Via Giulia the main thoroughfare of the sixteenth century, dredged the Tiber, repaired the walls, built churches, and in 1505 laid the foundation-stone of the new basilica of St. Peter's.

The government of the city was now the papal monarchy and the ancient republican institutions became, as they still remain, the organs of municipal administration. Yet the Romans had not ceased to be turbulent and the Orsini and Colonna families did not readily submit to papal rule. The classical revival encouraged republican aspirations, but the revolts led by Porcaro under Nicholas V and by Tiburzio under Pius II were easily crushed. In order to strengthen themselves against opposition the popes adopted a policy of nepotism and filled not only military and civil offices but the College of Cardinals with their relations. Calixtus III, the first Borgia pope, planted this notorious Spanish family upon Rome, and their doings during the pontificate of Alexander VI (1494-1503) were such as to recall the days of Theophylact and Marozia. When Alexander installed his illegitimate daughter Lucrezia in the Vatican and placed her in charge of his correspondence during his absence from the city, even Rome was scandalized. During the pontificate of Leo X (1513-1521) Renaissance Rome was at its zenith, Castiglione and Bembo were members of the court, Raphael, Michelangelo, and Leonardo were in the Pope's service. Artists and men of letters vied with each other in their admiration for classical antiquity and modelled their own work on that of the past. The Sienese banker, Chigi, entertained his friends with extravagant ostentation in the villa on the banks of the Tiber which Raphael had helped to decorate for him. This gay, pagan, highly civilized society was shattered by the events which took place during the wars between Charles V and Francis I. In September 1526 Charles V, outraged by Pope Clement VII's double-dealing, encouraged the Colonna to raid Rome, where they drove the Pope into the castle of S. Angelo and plundered the Vatican. This

was the prelude to the Sack of Rome, when, for three days in May 1527, the city was looted by German and Spanish troops. Atrocious crimes were committed, objects of supreme artistic value were destroyed, and Rome underwent an ordeal from which it took years to recover.

After the Sack of Rome the dominant spirit in the city was that of the Counter Reformation. Some of the most distinguished clergy and laymen of the day formed the Oratory of Divine Love, a society which met, not as earlier societies had done to discuss questions of art, letters, and manners, but to work and pray for the purification of the Church. The government of Rome became exclusively clerical. Cardinal legates and bishops ruled everywhere and laymen were relegated to subordinate posts. Colleges for foreign theological students were founded, and their members in their distinctive habits became a familiar feature of the streets (II, p. 261). The Inquisition was set up (1542) and strict discipline was enforced in matters of faith and morals; the Venetian envoy remarked that 'Rome seemed like a cloister'. Through the activities of baroque architects, Rome gradually took on the appearance which it presents to-day. Work at St. Peter's went on until the new Church was consecrated in 1626, and Bernini added his great colonnade. Churches such as the Gesù and S. Andrea della Valle were built and palaces and fountains sprang up in the same style. Sixtus V (1585-1590) added to the Vatican the great building between Bramante's galleries in order that it might house the Library, founded by Nicholas V. He set up four ancient obelisks in the city, the most notable being that which stands in the Piazza of St. Peter's. He is also responsible for the Via Sistina and the present layout of the Pincian Hill. Until the coming of Napoleon, life in Rome was unlike that of any other place in Europe. It was a city of violent contrasts, of wealth and poverty, ostentatious piety, and secret intrigue, where pilgrims and beggars jostled one another in the streets and fragments of royalty, such as Christina of Sweden and the last of the Stuarts, held miniature courts. Artists and men of letters settled in Rome to study in the libraries and museums. The wealthy aristocracy of Europe came thither to enjoy the pageantry of ecclesiastical ceremonies, the lavish entertainment offered them by the Cardinals and nobility, and the wild revelry of the Carnival.

In 1798 the people of Rome, acting under French pressure, proclaimed a Republic and the aged Pius VI was hustled out of the city to die in France in the following year. In 1800 the new pope, Pius VII, entered Rome, which the French had stripped of its treasures, and

lived uneasily under the French yoke until 1809. Napoleon then annexed Rome and proclaimed it the second city of his empire; the French flag appeared on the castle of S. Angelo and the Pope was forced to leave. On the birth of a son to Napoleon in 1811 the infant was given the title of 'King of Rome'. Meanwhile Pius VII had refused to compromise his rights in spite of the pressure put upon him, and he returned in triumph to Rome in 1814, just after Napoleon left for Elba.

Rome and United Italy

As in the rest of Italy, the restoration of the old regime in Rome resulted in futile efforts to put back the clock, and the confusion of politics and religion rendered the policy of repression adopted by the papal government peculiarly obnoxious to the people. Then, in 1846, came the phenomenon of a liberal pope. Pius IX issued a political amnesty, permitted the publication of newspapers under the supervision of lay censors, and sanctioned the formation of a civic guard. Later he granted a constitution with an elective lower chamber. His action inspired the group of patriots known as the neo-Guelfs to work for the federal union of Italy under papal presidency. Their plans were wrecked when, on the outbreak of war with Austria, the Pope declared his neutrality. His responsibilities as the head of Christendom debarred him from declaring war on any Christian nation and unfitted him for the role of champion of Italian nationalism. In Rome the control of affairs passed into the hands of the republicans, and in November 1848 Pius IX left for Gaeta. On 9 February 1849 a constituent assembly held in the Palazzo della Cancellaria announced that the temporal power of the Pope had fallen, and the government of Rome would be 'a pure democracy with the glorious title of the Roman Republic'. Mazzini, Saffi, and Armellini were made triumvirs and the defence of the city was entrusted to Garibaldi. Pius IX appealed to the Catholic Powers for armed intervention to restore him to Rome, and, in April, a French army advanced on Rome confident of taking the city within a week. The heroic resistance of the next two months could only postpone defeat, and on 2 July Garibaldi and some 5,000 troops left Rome on their great retreat. This immortal defence of the Roman Republic marked the end of its long history; it died in a blaze of glory.

In 1850 Pius IX returned to Rome, where his rule for the next twenty years was upheld by foreign bayonets. At last, when all the rest of Italy acknowledged Victor Emanuel II as King, Italian troops

under General Cardona made a breach in the walls beside the Porta Pia, and entered Rome on 20 September 1870. The Pope could only put up a token resistance and, soon after, Rome was proclaimed the capital of United Italy. When the royal family took up their residence on the Quirinal, and the Italian government was transferred to Rome, the Pope withdrew into the precincts of his own palace, and remained there for over half a century as the 'prisoner of the Vatican'. Roman society was split into Blacks and Whites and the old families of the papal entourage ostracized everyone connected with the Government, including the foreign diplomats accredited to it. Gradually the cleavage became less pronounced, and a solution of the problem of the relations between the Papacy and United Italy was generally desired. This was reached with the Lateran agreements of 1929. The Vatican City has become an independent State in which the Pope is sovereign, and the new importance of Rome as the capital of Italy does not overshadow its ancient prestige as the seat of the Papacy.

Public Buildings and Monuments (Plates I and 17-21)

There are buildings in Rome representing every phase of her history. Only the most outstanding are mentioned here.

The heart of ancient Rome is the Forum Romanum in the marshy hollow between the Capitoline and Palatine hills, which was drained in the sixth century B.C. by the construction of the Cloaca Maxima, the famous sewer which is still in use. The Forum was the political and commercial centre of the Republic and successive generations adorned it with temples and monuments. Among its typical features are the three magnificent columns of the Temple of Castor and Pollux, built in 484 B.C. in honour of the victory of Lake Regillus, the beautifully proportioned Arch of Titus (A.D. 81), and the Basilica of Constantine (A.D. 306-330) of which the arches served as a model for many Renaissance buildings. The Palatine Hill on the south was the site of Roma Quadrata, the primitive city which legend associates with Romulus. Its principal features to-day are the magnificent remains of the palaces of Roman Emperors. North of the Forum Romanum are the Imperial Fora. Within the last twenty years these were obscured by a jumble of streets and buildings, but the opening of the Via del Impero reveals a line of Fora and temples from Trajan's column to the Colosseum (II, Plate 5). The Capitol was at once the fortress and the religious centre of ancient Rome; the present Palazzo Senatorio is built over the remains of the Tabularium (78 B.C.) in which the State Archives were deposited. The Capitoline Museum

contains a fine collection of antique sculpture founded by Sixtus IV and added to by later popes. The most important Museum of Antiquities is, however, that of the Terme, so called from its position on the site of the Baths of Diocletian. An impression of the size, dignity, and general plan of the principal Roman baths can best be obtained at the Baths of Caracalla.

Christian Rome begins with the Catacombs, dating from the first to the fourth century. Places of refuge and of burial for the early Christian community, their walls adorned with inscriptions and paintings, they are of unique religious and artistic interest. The most frequented are those of St. Calixtus and St. Sebastian, on the Via Appia. Of the ancient Christian basilicas, dating from the fourth century, S. Giovanni in Laterano takes precedence over all other churches in Christendom. It has been rebuilt many times and is now a Baroque church, with numerous relics of its past (II, Plate 10). The old basilica of St. Peter, which replaced a still earlier oratory built over the tomb of the Apostle, was destroyed in the fifteenth century, and nothing remains of it but Giotto's much damaged mosaic of the 'Navicella', or Ship of the Church, in the portico. The present basilica is a masterpiece of the Renaissance, and the fullest expression of its artistic ideals. S. Paolo fuori le Mura was destroyed in 1823 by a fire from which only the cloisters escaped, but it was admirably rebuilt in its original form (II, Plate 9). S. Clemente is the best preserved of the basilicas; it consists of a lower church, of the age of Constantine, and an upper church, which belongs substantially to the eleventh century; below is a still earlier building, supposedly the house of St. Clement. The church is served by Irish monks. Sta. Maria Maggiore has fifth-century mosaics only second in importance to those of Ravenna.

The chief monument of Renaissance Rome, after St. Peter's (II, Plate 20), is the Vatican Palace. In general form this is of the fifteenth and sixteenth centuries, but later popes have made considerable additions to it. Of first importance are the frescoes which decorate its walls. The earliest are those of Fra Angelico in the Chapel of Nicholas V (1450-1455). Next in order of time are the frescoes on the walls of the Sistine Chapel painted for Sixtus IV by Botticelli, Perugino, Signorelli, and other artists of his day (1481-1483). Michelangelo's great series begins with the decoration of the ceiling (Prophets and Sybils, the Creation, 1508-1510) and culminates with his Last Judgement on the altar-wall, painted more than twenty years later. The rooms on the ground floor of the palace were occupied by Alexander VI and decorated at his orders by Pintoricchio with episodes from

the Gospel and the lives of the saints, in which figure portraits of the Borgia family and of the papal court of their day. Immediately above them are the rooms which Julius II chose for his own use and which he employed Raphael to decorate. The first two 'Stanze' show Raphael's art at its greatest, the two last were painted for Leo X and Clement VII, mainly by Raphael's pupils. The Vatican galleries contain a wonderful collection of antiques, Etruscan, Greek, and Roman, and works of art of every kind brought together by successive popes. The picture-gallery has recently been moved to a new building within the Vatican grounds. Among the palaces and villas, built by Cardinals and members of the nobility from the fifteenth century onwards, are the Villa Borghese, Palazzo Doria, Palazzo Barberini, Palazzo Corsini—each with their collection of works of art. The Villa Farnesina, decorated by Raphael with the story of Cupid and Psyche, is peculiarly charming. An attractive feature of Rome are the gardens which crown its principal hills, commanding fine views of the city. The most famous of these is the promenade of the Pincio with the Borghese gardens behind it. The garden of Villa Celimontano on the Caelian is noteworthy for its wide views stretching to the Alban hills. The heroes of the Risorgimento are commemorated on the Janiculum, dominated by the equestrian statue of Garibaldi, and their victory by the colossal monument to Victor Emanuel II at the foot of the Capitoline hill. Fascist Rome is represented by the Foro Mussolini, below Monte Mario, with its stadium surrounded by marble figures of athletes.

Industry and Commerce

Rome has throughout its long history generally been an administrative rather than an industrial centre, and has had to depend on external sources of supply. Although the largest city in Italy its industrial activity does not compare with that of the cities of the Northern Plain. Its industrial development has, no doubt, been hindered by the lack of a good port and of an industrial tradition. Throughout the ages the easy money of the tourist industry has discouraged hard work; whilst during the nineteenth century the popes looked askance at the mechanization of industry. On the other hand, Rome is an important route centre, and has numerous banking houses and an adequate supply of hydro-electricity. These factors have probably helped the city to become somewhat more industrialized during the last twenty years, and there are now several factories of more than purely local significance. Previously the main industries had been confined to

the processing of local products, such as wool, hides, corn, and milk.

During the 1930's about one-quarter of the working population of the city were engaged in industry and commerce, of whom over 25 per cent. were employed in transport, 16 per cent. in the building trade, 12 per cent. in the clothing industry, 10 per cent. in the metallurgical and engineering industry, and 6 per cent. in the printing industry. Rome's central position in the peninsula makes her transport services extremely important; her building activity has always been great and the clearance and constructional schemes of the Fascists have considerably helped the building trade. The most notable products of the metallurgical and engineering industries are railway carriages and tram cars, safes, agricultural machinery, and surgical instruments. The printing industry has a long and honourable tradition. Smaller percentages of the industrial population are engaged in the following industries: the food and drink (mainly pasta, flour, chocolate, biscuit, liqueur, and beer), wood, paper, chemical (manure, caustic soda, and explosives), textile (wool and rayon), and film industries.

Amongst the largest industrial establishments in Rome are: the 'Cisa' rayon factory (over 2,000 employees), the armaments factory leased by S.A. Ernesto Breda, the Molini e Pastificio Pantanella and Molino Centrale grain mills and pasta factories, and a soap factory of the S.A. Mira Lanza. The most characteristic industries, the majority of which have a long tradition, are of an artistic type, such as the making of furniture, tapestry, jewellery, artificial flowers, worked metals, leather goods, glass, china, pottery, majolica, mosaics, and statuary.

The tourist industry is of outstanding importance, visitors coming from all over the world to see the ancient capital of the Roman Empire and the Vatican City. It has been estimated that in recent years over half a million foreigners and one and a half million Italians annually visited the Eternal City.

As an agricultural centre, Rome has some importance and is one of the main wool markets in Italy.

Communications

Railways. The following lines converge on Rome (Stazione Termini):

1. Turin, Genoa, Pisa, Civitavecchia; double track, electrified.
2. Milan, Bologna, Florence, Orte; double track, electrified.

3. Ancona, Foligno; single track, electrified, to Orte, where it joins the line from Florence.
4. Naples, via Formia (Direttissima); double track, electrified.
5. Naples, via Cassino; double track.
6. Pescara, Sulmona; single track, electrified from Sulmona to Rome.
7. Albano Laziale, Frascati, and Terracina and Velletri; all these lines are single track and join the Naples line (via Formia) at Ciampino.
8. Fiumicino; single track, electrified, joining the Genoa-Rome line at Ponte Galeria.
9. Nettuno; single track, electric, joining the Naples-Formia line at Campo Leone.
10. Viterbo via Bracciano; single track.

There is a standard-gauge electric railway to Viterbo via Civita Castellana from the Stazione Piazzale Flaminia, and a narrow-gauge electric railway to Palestrina and Fiuggi from outside the Stazione Termini. A single-track electric line for Ostia and Lido di Roma starts from the Stazione S. Paolo.

Tramways. Electric trams serve the city and the suburbs. In the centre of the city they have been replaced by motor-buses. Electric tramways go to the following places outside Rome: the aerodrome and garden city of Ciampino, Albano, Frascati and Rocca di Papa, Genzano and Velletri, Tor Pignattara, and Centocelle.

Roads. Rome is the focal point of the road system of the peninsula, and the following main roads radiate from it:

Road 1. (Via Aurelia) by the west coast to Genoa and Ventimiglia.

Road 2. (Via Cassia) to Siena and Florence.

Road 3. (Via Flaminia) to Fano.

Road 4. (Via Salaria) to Porto d'Ascoli.

Road 5. (Via Tiburtina) to Pescara.

Road 6. (Via Casilina) via Frosinone and Cassino to Capua (for Naples).

Road 7. (Via Appia) to Capua, Naples, Benevento, and Brindisi.

Road 8. (Via Ostiense) to Ostia and Lido di Roma.

This last is now an *autostrada*.

Of the numerous other roads the most important run to Palestrina, Frascati and Lago di Albano, Anzio, and Fiumicino.

Waterway. The river Tiber is navigable for small boats to S. Paolo, the port of Rome.

Airways. The airport of Littorio on the east bank of the Tiber is the main airport of Rome. From it there were Italian services in 1939

to Ancona-Zara-Lussino-Pola-Trieste, Bologna-Venice, Milan, Turin, Tirana, Brindisi-Athens-Haifa-Baghdad-Basra, Brindisi-Tirana-Salonika-Sofia, Brindisi-Athens-Rhodes, Belgrade-Bucharest-Constanza, Venice-Budapest-Warsaw-Gdynia, Venice-Munich-Berlin, Rimini-Trieste-Bratislava-Prague, Milan-Frankfurt-Cologne-Rotterdam-Amsterdam, Marseilles-Paris-London, Naples-Palermo-Tunis, and Naples-Palermo-Catania-Malta. Other air services operated from the seaplane station at Lido di Roma. From here there were services to Alghero (Sardinia)-Cagliari-Tunis, Genoa-Marseilles-Barcelona, Palma (Majorca)-Barcelona, Palma-Melilla-Cadiz, Naples-Syracuse-Malta-Tripoli, Marsala-Tripoli, Tunis-Tripoli, Syracuse-Benghazi-Asmara-Addis Abbaba, and Palermo.

Other airfields are: Marcigliana a short distance north of the Littorio airfield; Cento Celle immediately south-east of the city; Magliana south-west of the city with a seaplane landing-place on the Tiber; and Guidonia north-west of Tivoli. There is a seaplane station at Vigna di Valle on the south shore of Lake Bracciano in the hills north-west of Rome.

ROVIGO. Altitude 20 feet. Latitude $45^{\circ} 4' N$. Longitude $11^{\circ} 49' E$. Population 14,561. Provincial capital. Seat of bishopric.

Position and Site

Rovigo is on the main north-south route crossing the eastern part of the Northern Plain and a centre for routes within the Polesine, the narrow and fertile strip between the F. Adige on the north and the Po on the south. The two rivers enter the Adriatic 31 miles to the east of Rovigo.

Rovigo is situated on the Naviglio Adigetto, a canal diverted from the Adige which flows about 2 miles north of the city. It is pentagonal in shape, the limits of the ancient centre being indicated by the remains of walls and bastions. The Adigetto cuts through the city from north-west to south-east and divides it into two unequal parts, the smaller western part being dominated by the ancient Castello. The city has spread chiefly on the south and on the north-west round the railway station.

History

Rovigo, the chief town of the Polesine, is first mentioned in a ninth-century document. It appears to have been subject to its bishop, owing at the same time some allegiance to the house of Este. In 1194

Azzo VI d'Este received the title of Count of Rovigo, and the control of the lords of Ferrara over the city became assured. Venice, however, began to look upon Rovigo and the Polesine with covetous eyes. From 1395 to 1438 she held the district in pledge from Niccolo III d'Este at the price of 50,000 ducats. In 1484 at the Peace of Bagnolo she forced Ercole d'Este to hand it over to her, and the recovery of Rovigo was one of the objects which brought Alfonso d'Este into the League of Cambrai (1509). Ferrarese troops occupied it in the course of the war, but before the end Venice was again in possession of it and retained it until the fall of the Republic (1797). In 1806 Napoleon made one of his generals Duke of Rovigo. On the expulsion of the French from Italy Rovigo remained in Austrian hands until 1866.

Public Buildings and Monuments

The cathedral of S. Stefano Papa dates in its present form from 1696. Two leaning towers are the most conspicuous remains of the Castello built in 920. The Palazzo dell' Accademia dei Concordi contains a library with some 300 incunabula and a picture gallery with a number of good paintings, mostly of the Venetian School. The church of the Madonna del Soccorso, or the Rotonda, is an interesting building by a pupil of Palladio (1594) with a fine detached campanile by Longhena (1655). Other monuments of note are the Renaissance Palazzo Roncale by Sammicheli (1555) and the bronze equestrian statue of Garibaldi by Ettore Ferrari.

Industry

Rovigo is an important hemp and sugar-beet growing district, and has hemp-spinning mills, rope walks, and sugar-beet factories. Boots and shoes, agricultural machinery, and straw hats are also made. The export of wine is important.

Communications

Railways. Rovigo is a junction on the main double-track line from Venice to Bologna for single-track lines to Verona via Legnago and to Chioggia via Adria.

Roads. Rovigo is on road 16 from Padua to Ferrara and the south. There is a main road to Legnago and a secondary road to Adria.

Waterway. The Naviglio Adigetto, which links the rivers Adige and Po, is navigable for shallow-draught barges up to 100 tons.

SAN MARINO. Altitude 1,627 feet. Latitude $43^{\circ} 57'$ N. Longitude $12^{\circ} 28'$ E. Population 1,850. Independent republic. Seat of bishopric.

Position and Site (Fig. 7)

At the centre of a group of mountains extending north-east from the Northern Apennines between the F. Marecchia on the north and the T. Conca on the south rises the triple-peaked M. Titano (2,480 ft.) with its jagged precipice facing eastwards (I, Plate 139).

The city stands on the western slopes of the most northerly peak of the mountain which is crowned by the fortress (2,421 ft.) overlooking the precipice on the east. The fortress, or Rocca, rises some 125 feet above the city, and the wall round the ancient nucleus links it with the towers crowning the second (2,480 ft.) and third (2,438 ft.) peaks. A suburb has grown up round the railway station (2,116 ft.) south of the city, but the chief area of expansion is the large suburb of Borgo Maggiore on a lower (1,709 ft.) shoulder below the cliff-face and north-east of the ancient city.

History

The little republic of San Marino has been in existence since the Diocletian persecutions of the third century, when, according to the legend, it was founded as a city of refuge by two Christian stone-masons, Marinus and Leo. Its recorded history, however, does not open until the ninth century when there is documentary evidence of a monastery there. From the monastic house and from the population which grew up round it, a free commune developed which has lasted until to-day. Various assaults on its liberty were made in the course of its history—from the Papacy and its representatives, from the Malatesta lords of Rimini, from Cesare Borgia and Napoleon. All ended in failure, and Napoleon was induced to rescind his decree for the suppression of the Republic by a patriotic citizen, Antonio Onofri, who afterwards successfully vindicated his city's independence at the Congress of Vienna. The chief interest of San Marino to the historian lies in its constitution, which retains the typical features of a medieval Italian city-state. Its basis is a Council of Sixty composed of twenty nobles, twenty citizens, and twenty peasants, elected, since 1906, every three years by the whole body of citizens. There is a smaller Council of Twelve, as well as committees for economic and foreign affairs. At the head of the Republic are two *Capitani Reggenti*, one from the city and one from the contado, who hold office for six

months at a time. The chief judicial officer, like the medieval Podestà, is chosen from another Italian city. The Republic has its own civic guard, postage stamps, coinage, and national flag.

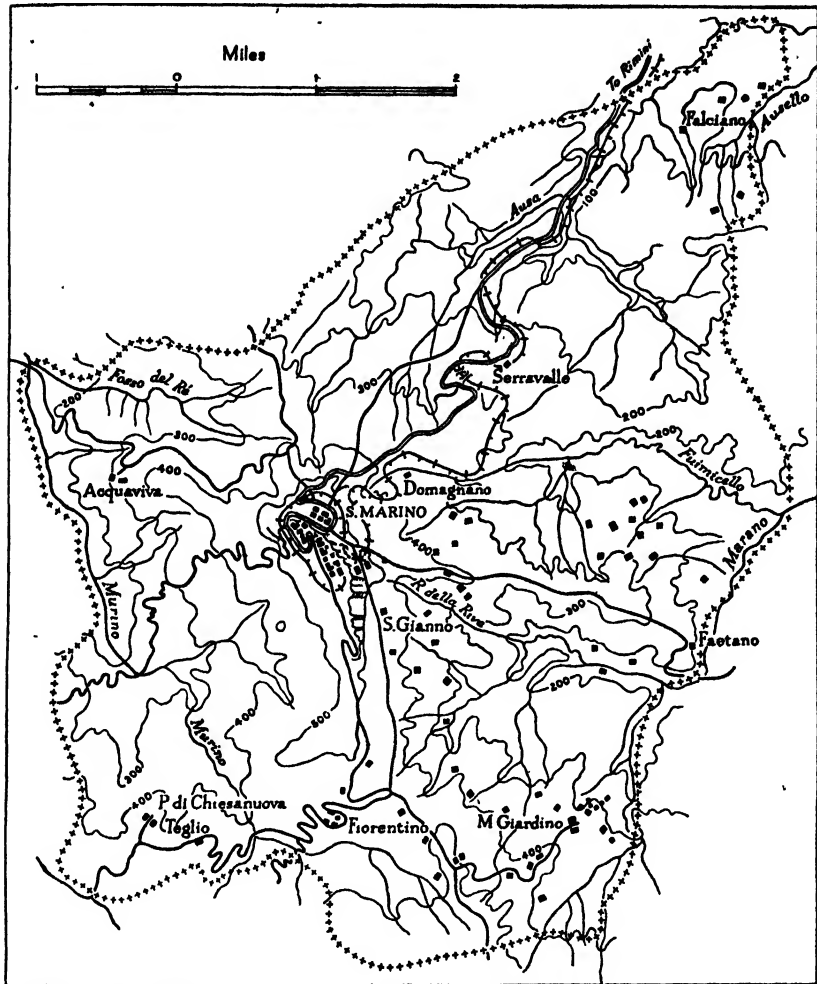


FIG. 7. *San Marino*

Public Buildings and Monuments

The most striking monument in San Marino is the triple citadel encircling the three mountain peaks which figure in the arms of the Republic and in themselves form a natural fortification. The first circle of walls and the Rocca date from the close of the thirteenth

century; the second circle and the tower known as Fratta were built about a hundred years later; the third circle and the Torre del Montale date from the sixteenth century. The principal church is the Pieve, a neo-classical building of the first half of the nineteenth century, which has replaced a medieval original. The Porta S. Francesco and the adjacent Franciscan church date from the fourteenth century. The Palazzo del Governo is a modern imitation (1894) of a medieval palace. In the Piazza della Libertà is a bust of Garibaldi commemorating the disbanding of his forces here on the retreat from Rome in 1848, and his own escape from the pursuing Austrians.

Industry

San Marino is primarily an agricultural state. Corn, maize, vines, mulberries, forage, and fruits are the principal crops, whilst the pasture- and wood-lands furnish provender for the cows and pigs. Bees and silkworms are also kept. The yield of corn (25,000 quintals per year) is more than sufficient for the needs of the State.

The industries are mainly traditional. Over 100 persons are stone cutters and masons, following the example of the saintly founder of the Republic, S. Marino. Brick and wine-making are important and some sulphur is worked. There is also a considerable manufacture of souvenirs in pottery, glass, and metal, whilst much revenue is gained from the State's postage stamps.

Communications

A narrow-gauge electric railway from Rimini to San Marino runs for the most part close to road 72, over which a motor-bus service plies.

SIENA. Altitude 1,056 feet. Latitude $43^{\circ} 19' N$. Longitude $11^{\circ} 21' E$. Population 36,064. Provincial capital. Seat of archbishopric. Chamber of Commerce.

Position and Site

Siena, the principal centre of the Siena trough, stands on the undulating plateau which forms the watershed between the north-flowing Elsa and the south-flowing Ombrone. The plateau has been cut into ridges and hills by these rivers and their tributaries, and large areas are desolate and liable to landslips. Where, however, the ground is firm, wheat and vines are grown. The Siena trough provides a continuous depression between the Mi. del Chianti on the east and the Catena Metallifera on the west. Routes along and across the

depression converge on Siena. The ancient Roman road, the Via Cassia, from Florence to Rome is still the main route and is crossed in Siena by the main route from the west coast across the Catena Metallifera and the Mi. del Chianti to Arezzo and the Adriatic. Routes along the valley of the Elsa from the lower Arno valley, Lucca, and the west coast enter Siena from Poggibonsi, where they join the main route from Florence.

The site of Siena spreads over the summits and slopes of three low hills rising above the general level of the plateau. The city thus divides naturally into three parts, the Terza di Città on the south-west, the Terza di S. Martino on the south-east, and the Terza di Camollia on the north. The centre of the city is the Campo (1,050 ft.), a concave semicircular area surrounded by public buildings and shops (II, Plate 38). From the Campo the Terza di Città, the original nucleus of Siena, climbs south-west to the highest point of the city at the cathedral, and steep narrow streets and closely built houses spread down the slopes round it to the enclosing walls (945 ft.). The Terza di San Martino, or south-eastern section of the city, rises from the Campo towards the church of S. Martino and descends southwards along a ridge to the Porta Romana, and south-east to the Porta S. Viene. The third and most elongated section, the Terza di Camollia, extends north from the Campo to the Porta Camollia, descending eastwards to the Porta Ovale and rising westwards to the Lizza or public gardens, laid out on the site of the old fortress (1,168 ft.). Suburbs have spread west of the fortress, north along the main road beyond Porta Camollia, east beyond Porta Ovale to the railway station (1,027 ft.), and south beyond the Porta Romana.

History

Siena is essentially a medieval city. Beyond the fact that she was a Roman colony—*Sena Julia*—under Augustus, very little is known of her early history, and her great days ended with the loss of independence in 1555. Early in the twelfth century Siena was a free commune, ruled by her own consuls; at first the nobles enjoyed a monopoly of political power, but in 1147 the people acquired a third share in the government. Nobles and people alike were engaged in commerce. Sienese bankers and money-lenders had depots in the chief towns of France and England, and the citizens were active in the cloth trade and in the sale of saffron, pepper, and other commodities imported from the east. In the struggle against the Emperor Barbarossa, Siena fought on the side of communal liberty, but in the thirteenth century

rivalry with Florence made her a stronghold of Ghibellinism. In 1260, when Florentine armies were advancing on Siena, the Sieneſe together with the Florentine exiles under Farinata degli Uberti, contingents from other Ghibelline cities, and troops ſent by Manfred, won a ſweeping victory over the Guelfs at Montaperti. In the hour of peril before the battle the Sieneſe had ſolemnly recognized the Bleſſed Virgin as their feudal ſuzerain. When their victorious forces returned, bringing with them the ſtandard of Florence, Siena called herſelf *Civitas Virginis* in recognition of her liege lady's protecting care, and the Feaſt of the Aſſumption (15 Auguſt) became the chief feſtival of the Republic. The ſtruggle for ſupremacy in Tuscany continued throughout the later Middle Ages, going inevitably in favour of Florence. Siena, beſides being ſmaller and leſs wealthy, was weakened by civic faction and the changes of government which this entailed. The citizens were divided into *Monti* or claſſes, and from 1277 to 1355 the government was in the hands of the *Monte dei Nove*, representing the rich burgher claſſ. This was the period of Siena's greateſt proſperity, but in 1355 the Nove were overthrown by a combination of oppoſing claſſes and the government fell into the hands, firſt of the *Dodici*, representing the ſmaller tradespeople, and then of a mixed magiſtracy known as the *Riformatori*; the nobles were excluded from political power. At this time Siena acquired new fame from the ſanctity of Caterina di Benicafa (1347-1380), the dyer's daughter better known as St. Catherine of Siena, who brought Gregory XI back to Rome. In 1399 the city fell to Gian Galeazzo Viſconti, but regained its liberty on his death. At the end of the fifteenth century a leading citizen, Pandolfo Petrucci (1487-1507) eſta-bliſhed an unofficial deſpotiſm of an enlightened type which did not long ſurvive him. In 1531 Charles V's armies occupied Siena and reſtored the nobles to power. The citizens made a laſt bid for liberty when in 1552 they revolted againſt the Emperor with French aid. For three years Siena held out againſt the combined attacks of Spaniards and Florentines, but in 1555 the city was forced to ſurrender. Some ſeventy families preferred exile to ſervitude and maintained the cauſe of Tuscany republicaniſm in the ſtronghold of Montalcino, but in 1559 they too yielded to Coſimo dei Medici, and the whole Sieneſe dominion became part of the Grand Duchy of Tuscany.

Public Buildings and Monuments

The Piazza, known as the Campo, in a hollow between Siena's three hills, forms the centre of the city's life. It is ſemicircular in ſhape,

paved with brick with an outer ring of stone, resembling the concavity of a shell. Here, in a setting of colourful medieval pageantry, Siena's celebrated horse races for the Palio are run. The races take place every year on 2 July and 16 August. Each ward enters a horse, and the winning ward celebrates its victory with a banquet at which the horse attends and eats from its own manger (II, p. 292). On the diameter of the semicircle stands the superb Gothic Palazzo Pubblico, and besides it rises the Torre del Mangia (1338-1348), one of the tallest and certainly the most graceful of Italian bell-towers. Among the frescoes which cover the walls of the various rooms in the Palazzo the most interesting are those by Ambrogio Lorenzetti (1338) in the Sala della Pace, on the subject of good and bad government. On the hill of the Terza di Città is the cathedral of the Assumption; raised on white marble steps with a richly decorated façade of polychrome marbles and a campanile banded in black and white, it presents a striking effect. It was begun about 1180 and belongs for the most part to the thirteenth and fourteenth centuries. The floor of the cathedral is ornamented with designs in marble, the work of the pavement masters of Siena between 1369 and 1547. Other important artistic monuments are Pisano's pulpit (1266-1268), the baptistery with Jacopo della Quercia's font (1428-1430), and the Piccolomini Library (1495) founded by the second Piccolomini Pope (Pius III) in memory of his uncle Pius II. Here Pintoricchio's frescoes tell with much charm the life-story of Aeneas Silvius Piccolomini (Pius II).

Via Fonte Branda leads down to the ancient fountain of that name, and near it is Via Benicasa, with the house of St. Catherine, under the shadow of the church of S. Domenico in which she donned the religious habit. In the Terza di Camollia are some of the finest palaces of the Sienese nobility, and here too is the Pinacoteca, containing a representative collection of works by the painters of the Sienese school. Near the Porta Camollia is a column commemorating the meeting of the Emperor Frederick III with his bride Eleanor of Portugal, which took place on this spot in 1451. Among the monuments of the Terza di S. Martino is the handsome Palazzo Piccolomini (1469). It contains the State Archives, which include the celebrated tax books of the Republic, each with its painted cover representing the outstanding event of the year. Siena is perhaps the most beautiful of Italian hill-cities. Its steep and narrow streets afford unexpected vistas of its principal buildings, and wide views over the surrounding countryside.

Industry

Siena has some artistic and traditional industries, and is the market for an agricultural and important wine-growing district. As in most Tuscan towns artistic furniture, glass, wax candles, bricks, and tiles are made. The tanning industry, connected with the local production of hides, is notable, whilst agricultural implements and chemical manures are manufactured to meet the needs of the district. There is a small textile industry working wool and locally produced silk. The production of wine, sulphur oil, and sugar is important, whilst the local confectionery, most notably *panforte*, deserves special mention.

Communications

Railways. Siena is served by a single-track line from Empoli to Chiusi, a junction on the Rome-Florence line. At Asciano a branch diverges from this line to Grosseto via Monte Antico, where it is joined by a private single-track railway from Siena via Buonconvento.

Roads. Siena is the meeting-place of two important highways, road 2 (Via Cassia) from Rome to Florence and road 73 which crosses Italy from the west coast (road 1) south of Leghorn to join road 3 some 20 miles from Fano on the east coast. There are secondary roads to the villages in the Siena trough and in the *M. Chianti*, whence they lead into the valley of the upper Arno.

Airfields. There is an airfield about 5 miles south-west of the city and another about 3 miles north-west.

SÓNDRIO. Altitude 1,007 feet. Latitude 46° 9' N. Longitude 9° 51' E.
Population 7,639. Provincial capital.

Position and Site

Sondrio is situated towards the eastern end of the east-west section of the Adda valley, known as the *Valtellina*. This fertile valley with the *Orobic Alps* on the south and the *Bernina Alps* on the north extends between walls dissected by numerous tributary streams. The flourishing city of Sondrio, on the northern or sunny side of the valley, stands on the fertile dejection-cone of the *T. Mallero*, which flows into the Adda from the deep gash of the *Val Malenco*. The actual site of the city is at the entrance of the valley, on the east bank of the *T. Mallero*, and set well back from the Adda which is liable to flood. Directly behind on the north rise the crags and terraces of the lower slopes of *Corno Mara* (9,209 ft.). The steep, terraced and

wooded slopes of M. Canale (8,274 ft.), on the west bank of the T. Mallero, complete the semicircle of hills round the city. Across the valley immediately beyond the Adda rise the lower slopes of the Orobic Alps.

The position of Sondrio at the entrance of the Val Malenco gives the city command of the road which serves this well-populated valley and terminates in the mountain basin to the east of M. Disgrazia (12,057 ft.). The Valtellina affords one of the few longitudinal routes in the Alps. It links the route from the Northern Plain along Lake Como to the Splügen pass both with the frontier at the S. Maria and Stelvio passes and, by means of the Aprica pass, with the route from the Northern Plain through the Val Camonica to the Adige valley.

History

Sondrio, as the chief town in the Valtellina, has shared in the chequered history of this Alpine valley, which has been the focus of the ambitions and rivalries of various European Powers. In the fourteenth century it fell to the Visconti of Milan, but it was coveted by the Swiss, and in the confusion which followed the death of Gian Galeazzo Visconti (1402) it was invaded by the men of Uri and Unterwalden. The last Visconti Duke re-established his authority over the valley, and Sondrio remained part of the Duchy of Milan until 1512. In that year the Swiss conquered Milan and their allies the Grisons occupied Valtellina, retaining it after the Swiss collapse at Marignano (1515). In the seventeenth century the Spanish rulers of Milan, anxious to secure control over a vital route to Austria, incited the Catholic inhabitants to rise against the Protestant Grisons in a revolt which won the name of the Holy Butchery of Valtellina. France intervened on the side of the Grisons, who after some years of warfare remained masters of the valley (1639). In 1797 Napoleon annexed the Valtellina to the Cisalpine Republic, and on his fall it was assigned, not to the Helvetic Confederation, in which the Grisons were now incorporated, but to Austria, who ruled it as part of Lombardy until 1859.

Public Buildings and Monuments

Sondrio contains few monuments of artistic interest. The principal church or Collegiata is an eighteenth-century building with a nineteenth-century façade. It contains paintings by G. P. Ligari (1686–1748), a native of Sondrio, who studied in Rome and Venice and returned to his home in 1727. The Palazzo Sassi Lavirsari has a

collection of works from his studio and that of his son. There are several fine palaces in the town, some dating from the sixteenth century. The Fascist era is represented by the Palazzo del Governo and the Casa dei Balilla.

Industry

Except for a large cotton mill with 47,000 spindles, industry in Sondrio is unimportant. Wine and sausages, however, are made locally, and there is a dye works and a tannery in the town.

Communications

Railway. Sondrio is on the line from Milan to Tirano, which is electrified throughout and is double track from Milan to Monza and single track beyond.

Roads. Sondrio is on road 38 from Colico to Bormio and the Stelvio pass. At Tresenda, east of Sondrio, road 39 branches from road 38 for Edolo and Bolzano (road 42). A main road branches from road 38 at Tirano for the Bernina pass. There is a secondary road from Sondrio to Chiesa up the Mallero valley.

TÉRAMO. Altitude 869 feet. Latitude $42^{\circ} 39' N$. Longitude $13^{\circ} 42' E$. Population 16,229. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site

Teramo stands at the south-eastern edge of the Mi. della Laga (alt. *c.* 5,500 ft.) which rise between the upper Tronto on the north and the upper Vomano and the Tordino on the south. The eastern flanks of the mountains merge towards the Adriatic into a broad indeterminate mass of lower hills (*c.* 1,640 ft.). Teramo is near the junction of these two contrasting types of country, for which it acts as a market and route centre. The main inland lateral route in the Adriatic Coastland passes through Teramo from Chieti in the south to Ascoli Piceno in the north. This is crossed in Teramo by another main route from the Adriatic along the Tordino valley to Aquila degli Abruzzi. Much of the region round Teramo grows vines, olives, and cereals, so that the city has become an important agricultural market.

Teramo stands on a narrow peninsula between the Tordino and its north-bank tributary the Vezzola. The town extends over terraces dissected by the two rivers and is limited on the west by foothills (*c.* 1,475 ft.) of the Mi. della Laga. The banks of the rivers are steep,

and the town rises gradually from a height of 850 feet near the confluence to 1,000 feet on the north-west, where the modern part reaches the foothills. Small suburbs extend beside the Tordino on the south-western edge of the town (c. 840 ft.), and beyond the Vezzola near the railway station (c. 775 ft.).

History

Teramo first appears as the chief town of the Praetutians, when, from its situation between two rivers, it was known as Interamna Praetutianorum. It passed under the rule of Rome in 268 B.C. and became a flourishing city of the Empire. Under the Lombards it formed part of the Duchy of Spoleto. It put up strong resistance to the Normans, and suffered considerably in so doing. In the middle of the fourteenth century it was exceedingly prosperous and its subsequent decline was due largely to the feuds between its own rival families, the Melatini and the Antonelli. When Francesco Sforza was lord of the March of Ancona he occupied Teramo for four years (1438-1442). He was driven out by Alfonso of Aragon, and from that time the city shared the fate of the kingdom of Naples.

Public Buildings and Monuments

The cathedral was begun by Bishop Guido in the twelfth century in the place of an earlier building destroyed by the Normans. It was enlarged in the fourteenth century and has since undergone much alteration. The fine portal dates from the fourteenth century. In the sacristy is a remarkable silver altar frontal by Nicola da Guardiagrele, a sculptor of the Abruzzi whose work was inspired by the Florentine Ghiberti. Near the cathedral are the remains of a Roman theatre. The Museo Civico contains a collection of antiquities, but its chief treasure, a polyptych, representing the Coronation of the Virgin and Saints by the Venetian Jacobello del Fiore (1370-1439) has been removed to the church of S. Agostino for which it was originally painted. Palazzo Melatino, dating from the twelfth century, and Palazzo Antonelli, which has recently been restored, were the houses of the rival families of Teramo. Some 2½ miles outside the city is the Osservatorio Astronomico Vincenzo Cerulli, founded by the astronomer of that name and presented by him to the nation in 1917.

Industry

Teramo has a somewhat wider range of small industries than most central Italian hill towns. Bricks, tiles, felt hats, and liqueur are

made, whilst leather is worked. There is also a foundry of local significance.

Communications

Railway. Teramo is the terminus of single-track branch-line from Giulianova on the main Adriatic coast railway.

Roads. Road 80 from Giulianova to Aquila degli Abruzzi crosses in Teramo road 81 from Ascoli Piceno to Chieti. This latter road forms part of the main inland route parallel with the Adriatic coast from Iesi in the north to Guardiagrele in the south.

TERNI. Altitude 427 feet. Latitude $42^{\circ} 33' N$. Longitude $12^{\circ} 39' E$.
Population 37,295. Provincial capital. Seat of bishopric.

Position and Site

Terni is situated at the eastern end of the Terni basin, one of the series of mountain basins in the Central Apennines which form the chief areas of population and cultivation. The Terni basin is crossed by the F. Nera which emerges on the east from its narrow upper course, and enters its gorge-like lower course at Narni, at the western end of the basin. The south wall of the basin between Terni and Narni is formed by the Mi. Sabini and the northern wall by the southern ends of the Falterona chain (I, pp. 318-320), the Martano ridge, and the Trasimeno-Narni ridge. Deep valleys intersect these mountain chains; the Nera valley borders the Falterona chain on the east; the area of lower land between it and the Martano ridge is dissected by the T. Serra and the T. Tescino; and the Martano and the Trasimeno-Narni ridges are separated from each other by the Naia valley. All three valleys are followed by routes, the first by a trans-Apennine road, the others by roads or railways leading to Perugia along the Foligno-Spoleto and Todi depressions. At the eastern edge of the Mi. Sabini lies the Velino valley, which joins the Nera valley a short distance east of Terni and is followed by a route leading to the Rieti basin. A secondary route crosses the Mi. Sabini to the Tiber valley, but this is more easily reached from the western end of the Terni basin through Narni where two routes diverge to the upper Tiber and Orvieto, and to the lower Tiber and Rome. Terni is a marketing centre for the fields and vineyards of the level floor of the basin and of the terraced lower-slopes of the surrounding mountains.

The city stands on the floor of the basin, where the T. Serra enters

the Nera from the mountains rising close on the north, and extends from north-east to south-west along the right banks of both rivers. The south-western end, where are the remains of the Roman amphitheatre, is the oldest. The chief industrial suburbs have spread into the angle between the rivers and to the west of the ancient limits of the city.

History

Terni is the ancient Interamna Nahars, and in Roman times was embellished with a theatre, baths, temples, amphitheatre, and a triumphal arch raised to the Emperor Domitian. It suffered severely at the hands of Goths and Lombards. Out of jealousy of its rival Spoleto, Terni welcomed Frederick Barbarossa, who bestowed it as a fief on Cardinal Montialli, afterwards the anti-pope Victor IV. Terni changed hands repeatedly in the following centuries, being held at different times by both Emperor and Pope, and the internal rivalry of Guelfs and Ghibellines devastated the city. After passing successively under the lordship of the Orsini, Ladislao of Naples, and the condottiere Braccio da Montone, it became finally subject to the Church. The Roman historian Tacitus was born at Terni and likewise the Emperor Claudius.

Public Buildings and Monuments

Terni has few buildings of interest. The cathedral has a twelfth-century portal, but is mainly of the sixteenth century. There are fragments of a Roman amphitheatre in the grounds of the episcopal palace and a few other Roman remains. The Palazzo Comunale contains a museum of antiquities and the Biblioteca a collection of pictures. The church of S. Francesco has a good Lombard portal and a handsome campanile (1445).

Industry

With the development of the Terni hydro-electric power scheme, which makes use of the waterfalls of the Velino, a large industrial area has grown up in the city and its surrounding districts. The armament industry is of outstanding importance, and a great part of the metallurgical and engineering industries are dependent on it. The Società Terni, the principal firm in the city, has large steel works, engineering works specializing in armaments and railway material, and an arsenal. This firm now controls the electro-chemical industry and produces nitrogen, cyanamide, and calcium carbide.

The Royal Small Arms arsenal is also notable, whilst the Società Bosco makes machinery for chemical works. The textile industry includes important jute and woollen mills, and is the only other large-scale industry. Other activities are connected with agriculture and forestry. There are over twenty establishments producing olive oil and sulphur oil, as well as soap factories, sugar-beet and pasta factories, tanneries, and saw-mills, whilst liqueurs, spirits, and mineral waters are manufactured.

Communications

Railways. Terni is on the main electrified line (double track from Terni to Narni) from Ancona to Orte and Rome. It is the junction for a single-track electrified line to Todi, Perugia, and Umbertide and for a single-track line to Rieti, Aquila, and Sulmona. Electric trams serve the town and the Nera valley to Ferentillo.

Roads. Terni is on road 3 (Via Flaminia) from Rome to Fano, and on road 79 from Rieti to Orvieto. Other main roads lead up the Nera valley to Norcia and Visso, and across the Mi. Sabini to join road 4 (Via Salaria) to Rome.

Airfield. There is a landing-ground about 2 miles south-west of the city and near road 3.

TRENTO (Trient). Altitude 637 feet. Latitude $46^{\circ} 5' N$. Longitude $11^{\circ} 8' E$. Population 37,290. Provincial capital. Seat of archbishopric. Chamber of Commerce.

Position and Site

Trento is in a constriction of the deep north-south Adige valley where two tributary valleys breach its steep limestone flanks. From both east and west important routes join the great through-route along the Adige which links Verona with the Brenner pass. From the east the main road from Venice and the Northern Plain enters from the Val Sugana through the Fersina valley which separates M. Calisio (3,596 ft.) on the north from the Spiazza Grande (4,217 ft.)—Chegul (4,829 ft.)—Marzola (5,692 ft.) ridge on the south. From the west the main road from Brescia along the west shore of Lake Garda and through the Riva—Toblino—Terlago valley enters the Adige valley by the gorge of Valle Buco di Vela, which divides Soprasasso (2,648 ft.) on the north from M. Vazon (5,215 ft.) on the south.

The Romans early realized the strategic advantages of this narrowing in the Adige valley and chose as the site of their fortress the rock

of Doss Trento (1,011 ft.) on the right bank of the river. This isolated spur not only controlled the passage up and down the main valley and the entrance to the Fersina valley but also directly commanded the western road, which, after entering the Adige valley, passes through the narrow gateway between Doss Trento and the foothills of M. Vazon. Trento instead of growing up immediately round the fortress on the right bank has spread on to the much wider left bank where the main road from Verona joins the old trade-route from Venice.

The city extends over a series of low terraces between the left bank of the Adige and the right bank of the tributary T. Fersina. The cultivated lower slopes and wooded upper slopes of M. Calisio rise between the two rivers. Road and rail bridges link Trento with the suburbs which extend beyond the T. Fersina at the foot of Spiazza Grande. The characteristically Italian appearance of the city with its broad streets, spacious squares, numerous towers, and Renaissance palaces has remained unaltered by political changes.

History

Trento was the Tridentum of the Romans who conquered it in 222 B.C. The city which grew up on the left bank of the Adige was encircled by walls with twenty-seven towers and obtained the status of a municipium. Under the Lombards it was the seat of their northernmost duchy. To the German Emperors it was a matter of great importance to have this strategic position on the Brenner pass in friendly hands, and in 1027 Conrad II vested all temporal rights over Trento and the surrounding district in the bishop. Save for short intervals, when Ezzelino da Romano took possession of the city and when the citizens rose against their bishop and proclaimed a commune, Trento was ruled by its prince-bishops until 1796. The prolonged efforts of Venice to obtain control were successfully resisted, with the aid of the Habsburgs, who in 1512 established a protectorate over the principality. Among outstanding Bishops of Trento were Bernardo Clesio, a great patron of the arts, against whom his Lutheran subjects rose in revolt in 1525, besieging him in his capital, and Cristoforo Madruzzo, who acted as host to the ecclesiastics from all parts of Europe attending the sessions of the Council of Trent (1545-1563). When the French entered Trento in 1796 the bishop fled and his temporal power was formally abolished in 1803. The Congress of Vienna assigned Trento to Austria, and, despite its predominantly Italian population, it remained in Austrian hands

until 1918. Its recovery by Italy marked the fulfilment of one of the chief aims of the irredentist movement.

Public Buildings and Monuments

Trento is a picturesque old town with buildings markedly Italian in character. A particularly fine monument to Dante by P. Locchi (1896) is the first object which meets the eye on coming out of the station. The cathedral of S. Vigilio is dedicated to a Bishop of Trento who suffered martyrdom in the fifth century. It is an impressive building, made entirely of marble, which was begun in 1145 and completed in 1515. In the interior are the tombs of various bishops, and the Crucifix before which the decrees of the Council of Trent were promulgated. Other buildings in the Piazza del Duomo (now Vittorio Emanuele) are the Palazzo del Pretorio, until the thirteenth century the episcopal palace, a Roman tower called the Torre Grande, and a graceful eighteenth-century Fontana del Nettuno. The great episcopal stronghold known as the Castello del Buon Consiglio consists of three buildings—the thirteenth-century Castel Vecchio, splendidly restored by Bishop Hinderbach in 1475, the Magno Palazzo built by Bishop Clesio (1527–1531), and a connecting wing of the seventeenth century. Here Cesare Battisti and other Italian patriots were tried and executed by the Austrians in 1916. The private apartments of Bishop Clesio now form an archaeological museum which includes the Tabula Clesia with an edict of the Emperor Claudius dated A.D. 46. The Renaissance church of Sta. Maria Maggiore was the scene of several sessions of the Council of Trent.

Industry

Trento is an agricultural market and has an important ferro-alloys factory (ferro-silicon), a chemical works for anti-knock compounds, woollen spinning mills, and cotton mills working for the Michelin tyre firm. There are cement works and slate and marble quarries in the neighbourhood.

Communications

Railways. Trento is on the double-track electrified line from the Brenner pass to Verona. There is a single-track line from Trento to Venice via the Val Sugana.

An electric tramway runs from Trento to Mezzocorona and Malè. A motor-bus to Zambana connects Trento with an aerial railway to

Fai and Paganella. There is also an aerial railway to Sardagna, on the slopes of M. Bondone.

Roads. Trento is on road 12 from the Brenner to Verona. Road 45-*bis* goes from Trento to Brescia via Riva and the west shore of Lake Garda, and road 47 from Trento to Padua via the Val Sugana. A main road diverges from road 12 at Lavis for Cavalese and road 46 at Rovereto for Vicenza. There are secondary roads to Carbonare and Zambana.

Waterway. The F. Adige is navigable in parts up to Bolzano.

Airfield. There is an airfield near Roncaforte, about 2 miles north-north-west of the city.

TREVISO. Altitude 49 feet. Latitude $45^{\circ} 40' N$. Longitude $12^{\circ} 15' E$. Population 43,949. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site

Treviso is situated in the eastern part of the Northern Plain midway between the Montello hill on the north and the Laguna Veneta on the south. The early foundation of the city is explained by its position at the intersection of two routeways. From Venice a main route runs north to enter the Alps by the Piave valley, and is crossed at Treviso by the main east-west route from Trieste to Milan. Thus Treviso has become an important route and industrial centre and a market for the rich agricultural lands of the surrounding plain.

The city stands at the confluence of the east-flowing Sile and the south-flowing Bottenigo. The ancient city is rectangular in shape and is surrounded on three sides by an artificial moat, and by walls which are still standing. The fourth, or southern side, is bordered by the Sile. Further channels divide the city into a series of small islands. All round the ancient city suburbs have grown up, more especially on the south beyond the Sile and round the railway station.

History

Treviso was called by the Romans Tarvisium. It was particularly flourishing under the Lombards, when it had its own mint which continued to issue coins for several centuries. It was granted a charter by Barbarossa in 1164, but joined in the same year with Verona, Padua, and Vicenza in the League of the Mark of Verona, which was afterwards absorbed into the Lombard League. In 1219 it was prosperous enough to enlarge its circle of walls, and it was famous

at that time as the resort of troubadours, who gathered there for a chivalrous festival known as the Castello d'amore. The contest of factions, both within and without the city, led in 1283 to the establishment of a native Signoria in the person of Gherardo da Camino. Dante calls him 'the good Gherardo', and cites him as an example of true nobility. His son Riccardo was made imperial vicar of Treviso by Henry VII in 1311, but was assassinated next year in his own palace when he was playing chess. In 1329 Treviso fell to the Scala lords of Verona, but was ceded by them to Venice in 1339. Thus Treviso was the first mainland city to come under Venetian rule, and except for a short period (1381-1388) when first Leopold of Austria and then the Carrara lords of Padua gained possession of it, it remained part of the Venetian dominions until 1797. After being bandied about between France and Austria it was included in United Italy in 1866. During the War of 1915-1918 it suffered considerably from air-raids, some 1,500 bombs being dropped upon it.

Public Buildings and Monuments

In the picturesque Piazza dei Signori is the Palazzo del Trecento (1207), so called because it was built as the meeting-place of the Great Council of the commune, composed of 300 citizens. The Palazzo del Governo is a nineteenth-century building modelled on its medieval neighbour; adjoining it is the battlemented Torre del Comune. The cathedral of S. Pietro is a building in several styles ranging from the eleventh-century crypt to the façade added in 1836. It has some first-rate pictures including an early work of Titian, representing the Annunciation, and an Adoration of the Shepherds by Paris Bordone (1500-1571), a native of Treviso. The baptistery of S. Giovanni dates from the tenth or eleventh century and has suffered very little restoration. The Pinacoteca, now housed in a palace in the north-west corner of the city, has a representative collection of pictures, mainly of the Venetian school. Among numerous churches the large Gothic church of S. Nicolo, with frescoes by Tomaso da Modena, is the most important.

Industry

The silk industry is very important, Treviso being the collecting centre for a district of most intensive cocoon production. There are mills for weaving and spinning silk, as well as for the manufacture of silk and cotton hosiery. Other major industries include the manufacture of paper and paper goods, rustic and domestic furniture

(mainly of cane), bricks, tiles, lime, cement, artistic pottery, oxygen gas, chemical manure, and tartaric acid. There are also small pasta factories, distilleries, flour mills, rice polishing mills, and engineering works.

Communications

Railways. Treviso is on the double-track line from Venice to Udine. A single-track line branches from the above at Conegliano for Calalzo-Pieve di Cadore. There is a double-track line from Treviso to Vicenza, and single-track lines to Belluno and Calalzo-Pieve di Cadore and to Portogruaro, a junction on the Venice-Trieste line, and Casarsa, a junction on the Udine line. The single-track line to Camposampiero, Legnago, and Ostiglia has recently been opened.

Tramways. Electric trams traverse the city from the Central Station. Electric trolley-buses ply to Venice via Mestre and the Ponte del Littorio.

Roads. Treviso is on road 13 from Venice to Udine and on road 53 from Vicenza to Portogruaro. Other main roads lead to Padua and Feltre.

Waterway. The F. Sile is navigable to Treviso for barges of up to 40 tons.

Airfields. There is an airfield about 5 miles north of Treviso and another about 4 miles west-south-west.

TURIN (Torino). Altitude 784 feet. Latitude $45^{\circ} 4' N$. Longitude $7^{\circ} 41' E$. Population 608,211. Provincial capital. Seat of arch-bishopric. University. Chamber of Commerce. British Consul.

Position and Site (Fig. 8; Plate 22)

Between the Monferrato hills on the south-east and the morainic hills fringing the Cottian and Graian Alps on the west, the Northern Plain curves from an east-west to a north-south direction and narrows to a constriction less than 10 miles wide. Turin, on the west bank of the Po at the confluence of the Dora Riparia, controls this constriction. Through it passes the main longitudinal route across the Northern Plain, which is joined at Turin by routes across the Maritime Alps from the Tyrrhenian coast, by the Mont Cenis pass and other routes across the Cottian and Graian Alps from France, and by a route across the Monferrato hills and along the Tanaro valley. Turin is thus one of the most important road and railway centres in Italy. It is also a market for the well-cultivated surrounding plain and hill-slopes,

and an industrial centre dependent on local hydro-electricity for its power.

The city spreads over a low level terrace on the west bank of the Po. Morainic foothills covered with fields and vineyards rise gradually on the west to the steep edge of the Western Alps, while immediately beyond the Po on the east the Monferrato hills rise steeply. The ancient city was limited by the Po on the east and the Dora Riparia on the north. The rectilinear layout of the streets in its centre and the remains of Roman walls and buildings betray its Roman origin. Nothing remains of the sixteenth-century walls enclosing the city which spread round this nucleus, but the site of the Cittadella is marked by public buildings and gardens. The modern city with its broad streets, squares, parks, and extensive industrial suburbs spreads north beyond the Dora Riparia almost to the T. Stura di Lanzo, south to the T. Sangone, and west towards the Alpine foothills. A narrow fringe of houses borders the east bank of the Po and spreads up the lower slopes of the Monferrato hills.

History

The ancient Taurasia was the home of a Gallic tribe which the Romans made into a military colony, under the name of Augusta Taurinorum. Under the Lombards Turin was the capital of a duchy and under the Franks it was ruled by counts. After the collapse of the Carolingian Empire the Counts of Turin took advantage of the struggle between rival claimants to the imperial title to improve their own position. Berengar of Ivrea alienated Turin to a certain Count Ardoïn Glabrio, who became one of the leading magnates of north Italy, and in 973 took part in the extirpation of the Saracen colony at Fraxinet. In the eleventh century Adelaide, Countess of Turin, the descendant of Ardoïn, married Oddone, son of Umberto Biancamano, Count of Savoy, the ancestor of the present King of Italy. Thus Turin passed to the house of Savoy, which now had dominions on both sides of the Alps. During the twelfth and thirteenth centuries Turin threw off the yoke of its suzerain and developed the institutions of a self-governing commune, in defiance of the claims of both count and bishop. In the fourteenth century it became finally subject to the Counts of Savoy, whose power steadily increased, especially after they were raised to the rank of Dukes. Amadeus VIII (1416-1434), the first Duke, did much to consolidate his dominions before he retired to live a hermit's life on the shores of the lake of Geneva and to be elected Pope Felix V by the Council of Basel.

The dukes had as yet no fixed capital, but Turin was the favourite residence of Charles I (1482-90). During the period of the Italian wars Turin, owing to its position, was an object of importance to the invaders. In 1494 Savoy was ruled by the Duchess Bianca, the regent for Charles II, and as a cousin and friend of Charles VIII of France she welcomed him in Turin when he crossed the Alps. Under Charles III (1504-1553) Savoy supported the cause of the Emperor Charles V, with the result that the duchy was conquered by Francis I and held by France from 1536 to 1559. At the Treaty of Câteau Cambrésis, Emmanuel Philibert, who had been one of Charles V's most successful generals, was restored to his duchy, and although a French garrison remained in the fortress of Turin until 1562, a new era began for the city. From that time the ambitions of the Dukes of Savoy were directed towards Italy rather than towards France, and Turin became their principal residence. During the Middle Ages the city had increased little in size. Its walls in the sixteenth century enclosed the rectangle formed by the Roman city, marked by the modern streets of Garibaldi, Porta Palatina, and S. Tommaso, set well back from the rivers Po and Dora. Charles Emmanuel I (1580-1630) founded the Città Nuova, in the direction of the present Central Station. An expansion towards the Po took place under Charles Emmanuel II, of which the first stone was blessed in 1673. Thirdly, Victor Amadeus II (1675-1730), the first member of the house of Savoy to bear the title of King, founded a new quarter which included the present Piazza Savoia and Porta Susa. In all these expansions the rectangular planning of the Romans was maintained and Turin to-day is a city of straight lines.

During the long struggle between France and Spain in the seventeenth century the Dukes of Savoy, determined to maintain their independence, fought sometimes on one side, sometimes on the other, and Turin withstood sieges in 1639 and again in 1706. The last was made memorable by the heroism of Pietro Micca, who gave his life in exploding a mine, and thus saved the city. The siege was finally raised by the duke's cousin, Prince Eugene, whose victories contributed much to the defeat of France. In 1796 Napoleon occupied Turin, and in 1798 the whole of Piedmont was incorporated in France until 1814. In that year the people of Turin welcomed back their hereditary rulers with enthusiasm, and became under their leadership the architects of Italian unity. Count Camillo Cavour was a native of Turin, and his statesmanship together with the military tradition of Piedmont were the outstanding factors in the wars of liberation.

In 1861 Victor Emmanuel II became King of Italy and for four years Turin was his capital. Meanwhile the development of the city continued without interruption until Turin became the great modern city, and the commercial and industrial centre, which it is to-day.

Public Buildings and Monuments

Turin is a splendidly laid-out modern city, with wide, straight streets, large squares, spacious public gardens, and fine churches and palaces, dating for the most part from the seventeenth century and after. Of Roman remains the most important is the Porta Palatina, a two-arched gateway with sixteen-sided towers, which formed the Porta Principalis Dextra of the Augustan wall. The cathedral of S. Giovanni Battista was built in 1492-1498 and is the only Renaissance building in Turin; it has a handsome marble façade. Inside is the Chapel of the Holy Shroud, built (1694) to contain the sacred relic which was brought from Jerusalem in the fourteenth century and, having been presented to the Dukes of Savoy, was finally installed at Turin by Emmanuel Philibert (1578). The walls are lined with black marble, against which stand out the white monuments erected by Charles Albert in memory of four of his ancestors (1842). Among other noteworthy churches are the sumptuous Santi Martiri begun in 1577, S. Filippo, the largest church in Turin rebuilt by Juvara in 1714, and the Gran Madre di Dio, an imitation of the Roman Pantheon built 1818-1831, to celebrate the return of Victor Emmanuel I from exile after the French occupation. In the Piazza Castello, one of the principal centres of civic life is the Palazzo Madama, once a medieval castle built on a Roman site and transformed by Juvara in 1718 into a residence for Madama Reale, the widow of Duke Charles Emmanuel II and mother of King Victor Amadeus II. The Palazzo Reale (1646) contains paintings and statues and many sumptuous apartments; at the right-hand corner of the palace is the loggia from which Charles Albert declared war on Austria in 1848. Close by is the Royal Armoury with a collection of armour only second to that of the Madrid Escorial. The Palazzo Carignano was the birthplace of Victor Emmanuel II, and the meeting-place of the subalpine Parliament (1848-59), summoned in accordance with the celebrated Statuto. The palace has a baroque façade overlooking the Piazza Carignano and an elaborate nineteenth-century façade facing the Piazza Carlo Alberto. Near by is the Palazzo dell' Accademia delle Scienze, containing a museum of antiquities and a picture gallery with a large and valuable collection of paintings, including Van Dyke's Three Children

of Charles I of England presented by Queen Henrietta Maria to her sister, Christina of Savoy. The Mole Antonelliana, said to be the loftiest walled building in Europe, was begun in 1863 as a Jewish temple and finished as a memorial to Victor Emmanuel II; it contains the National Museum of the Risorgimento. The most attractive of the public gardens is the Parco del Valentino, laid out along the left bank of the Po. The Castello del Valentino was built in 1633 by Duchess Christina, in the style of a French château. In another part of the park there are reproductions of a medieval village and castle erected for the Exhibition of 1884. The International Exhibition of 1911 was marked by the building of the vast stadium, capable of seating 50,000 persons. One of the features of Turin are the numerous statues commemorating princes of the house of Savoy and heroes of the Risorgimento. Notable among these is the bronze equestrian statue, by Marochetti (1838), of Emmanuel Philibert; bas-reliefs on the pedestal depict his victory at St. Quentin (1557) and the Treaty of Câteau-Cambrésis (1559), which restored to him his dominions. The statue of Charles Albert, with symbolic figures of Martyrdom, Independence, Freedom, and Justice, is also by Marochetti (1861). There is a fine statue of Cavour by Dupré (1873), and the newest part of Turin has a monument by Costa (1899) to Il Gran Re (Victor Emmanuel II).

Industry

Turin is, after Milan, the most important industrial city in Italy and has 4 per cent. of its industrial population. About one-third of the inhabitants of the city over the age of ten are engaged in industry.

Turin's main industry is mechanical engineering, in which the manufacture of motor vehicles is outstanding. The Fiat Company (Fabbrica Italiana Automobili Torino), which accounts for 90 per cent. of the Italian production of motor vehicles, has the greater part of its works in Turin and its suburbs; altogether it employs 60,000–70,000 workers, and its undertakings include two large steel works which, but for the notable exception of aluminium, manufacture nearly all the component parts of the company's products. The steel works in Turin and at Avigliana have an annual capacity of 100,000 tons of steel and are among the most important in Italy. The finished products include motor-cars, lorries, tractors, and tanks as well as aircraft engines, diesel engines, and locomotives. The famous Lingotto works are reported to be among the largest in Europe (III, Plate 63). The newer Mirafiori works built in 1942 for the manufacture of aeroplane fuselages and aero-engines are possibly larger.

The Lancia Company, which is the second most important manufacturer of motor vehicles, is also in Turin. The city is well known for its special coachwork, made principally by the Officine Viberti. The Sezione Materiale Ferroviarie of Fiat is one of the three leading locomotive-building concerns in Italy for both steam and electric locomotives. Here too is the second most important cable-producing firm, the S.A. Ingg. Tedeschi V., which manufactures a range of products similar to that of Pirelli (p. 102). Pumping and hydraulic machinery together with compressors and plant for chemical works is made by S.A. Ingg. Aredoli and Bertola. Agricultural machinery is also manufactured.

The textile and clothing industry is only less important than that of metallurgy and engineering. Turin is one of the five major centres of the cotton industry in Italy, the chief manufacturers being Cotonificio Valle di Susa, the Cotonificio Riuniti Fratelli Poma, and Fratelli S.A. Manifatture di Cuorgne. Snia Viscosa, one of the largest rayon manufacturing companies, has its headquarters and some mills at Turin. The S.A. Cisa, which also has mills at Turin, produces only viscose yarns. Woollen blankets and jute sacking are made in the city, which is an important collecting centre for silk cocoons. Altogether there are 400 clothing factories, and the main types of goods produced are stockings, knitwear, hats, and lace. The food industry is also important and includes a well-known confectionery factory making high-class chocolate and caramels. The production of Vermouth is considerable. The chemical works belonging to Montecatini manufacture medicinal products, oxygen and other gases, distillation pitch, sulphuric acid, fertilizers, synthetic resins, and carbon disulphide. The leather industry, including tanning and several large boot and shoe factories, is notable. Amongst many other goods produced are paper, artistic and cheap grades of furniture, hardware, glue, and gelatine.

Communications

Railways. Turin's importance as a railway centre is second only to that of Milan. The following lines converge on it:

1. Modane and the Mont Cenis tunnel; mainly double-track electrified. A single-track electrified line from Susa joins the above at Bussoleno.
2. Milan-Novara; double track: this line is joined at Settimo by a single-track line from Castellamonte and Pont, at Chivasso by single-track lines from Aosta and Ivrea, Asti, and Casale Mon-

ferrato, and at Santhia by single-track lines from Arona and Biella.

3. Alessandria (junction for Piacenza and Genoa and Rome)—Asti—Trofarello; double-track electrified. Single-track electrified lines from Genoa via Ovada and Acqui join the above at Asti and from Chieri at Trofarello.
4. Savona—Ceva—Fossano; double track from Ceva, electrified throughout. A loop line (single-track electrified) leaves the above at Ceva for Brà and rejoins it at Carmagnola. A single-track electric line from Ventimiglia and Cuneo joins the above at Fossano.
5. Torre Pellice—Pinerolo; single-track electrified: this line is joined at Bricherasio by a single-track electrified line from Burge and at Airasca by a single-track line from Cuneo—Busca—Saluzzo—Moretta.
6. Cere—Lanzo; single-track electrified.

Tramways. Electric tramways traverse the principal streets, and run to the following places: Rivoli, Sassi (the starting-point of a funicular to Superga), Settimo, Bertulla, and Pianezzo.

Steam-tramways run to: Carignano (for Carmagnola) and Saluzzo (for Cuneo); Orbassano (for Giaveno), Cumiana, Pinerolo, and Perosa Argentina; Druent; Venaria Reale; Gassino—Bruasco (electrified as far as Chivasso); Poirino (electrified as far as Trofarello); and Mirafiori-Stupingi.

Roads. Turin is the starting-point for the following roads: An autostrada to Brescia; road 10 via Alessandria, Cremona, and Mantua to Monselice on road 16; road 11 to Milan and Venice; road 20 to Cuneo and Ventimiglia; road 23 to Pinerolo and the Monginevro pass; and road 25 to Susa and the Mont Cenis pass.

Road 26 diverges from road 11 at Chivasso for Ivrea and Aosta, and road 31-bis along the north bank of the Po to join road 31 at Casale; road 29 to Savona diverges from road 10 at Poirino. Other main roads from Turin run south of the Po to Casale; up the Orco valley to Cuorgne; up the Stura valley to Lanzo; and to Pinerolo, Torre Pellice, and Cuneo.

Airways. The main airport is at Mirafiori, on the southern outskirts of the city. Italian air services were operated in 1939 to Rome, Milan—Venice, Cannes—Marseilles, Paris—London, and Venice—Zagreb—Belgrade. There is a seaplane base on the Po at Ponte Isabella. Other airfields are the Ansaldo, 2 miles west of the city, and the Venaria Reale, 3 miles north-west.

UDINE. Altitude 361 feet. Latitude $46^{\circ} 3' N$. Longitude $13^{\circ} 14' E$. Population 54,638. Provincial capital. Seat of archbishopric. Chamber of Commerce.

Position and Site

Udine is situated in the eastern part of the Northern Plain within the angle formed by the Venetian Alps on the north-west and the Julian Alps on the north-east. The two groups of mountains are separated by the valley of the F. Tagliamento, which, on emerging from its mountain course, crosses an amphitheatre of morainic hills further restricting the area of lowland north of Udine. The city stands on the high plain to the east of the Tagliamento and at the southern edge of the well-cultivated morainic hills. These rise abruptly to about 500 feet above the plain itself, but are breached immediately north of Udine by the Tarcento gap, which provides an easy route to the upper Tagliamento valley, an important nucleus of routes through the Carnic Alps. Immediately east of Udine there is easy access to the Natisone valley, which, in its turn, provides a good route across the Julian Sub-Alps to the upper Isonzo valley. Routes west and south across the plain are relatively easy, so that Udine has become a nodal centre and the market for the rich neighbouring agricultural region.

Like many other cities of the plain the site of Udine was determined originally by the need of defence. The ancient rectangular city extends round the base of a low isolated hill (449 ft.) surmounted by the fortified Castello. The Castello hill is encircled by two water channels, the Canale Ledro, flowing from the north-west, and a canal diverted from the T. Torre in the twelfth century, flowing from the north-east. These formed the limits of the ancient city, round which suburbs have spread in all directions, particularly on the west and round the railway station on the south.

History

The castle of Udene was granted to the Patriarch of Aquileia by a diploma of the Emperor Otto II (983); the city of Udine was founded when the patriarch Bertoldo transferred his seat here from Cividale about the year 1238. The citizens then received rights of self-government and of market, and enjoyed the privilege of sending a representative to the parliament of Friuli. Tuscan merchants settled in Udine, and the city prospered despite constant feuds with Cividale. In the fourteenth century, lords of neighbouring castles were included in

the commune and among them the family of Savorgnano, who acquired a dominant position in the city. The position won by the Savorgnani brought them into conflict with the patriarch, and Tristano Savorgnano was ejected from Udine with the aid of the Emperor Sigismund. In 1420 he returned with the Venetian forces and, for the remainder of the century, he and his successors were the chief supporters among the nobility of Venetian rule in Friuli. The patriarch lost his temporal dominions, and Udine became the seat of the Venetian Lieutenant-General. During the War of the League of Cambrai (1509-1513), Venice had to yield Friuli to the Emperor Maximilian, but she recovered her former possessions at its close, and Udine remained in Venetian hands until the fall of the Republic (1797). After a period of French occupation it passed to Austria, and from 1848 to 1866 it was a centre of anti-Austrian conspiracies. In 1866 Austria ceded it to Italy. During the War of 1915-1918 it was the headquarters of the Italian army. The Austrians occupied it in 1917, and a year later the Italians re-entered the city.

Public Buildings and Monuments

In the centre of the city is the Piazza Vittorio Emanuele surrounded by a picturesque group of buildings. The Palazzo del Comune, built in the Venetian Gothic style (1448-1456), is of white and red stone with a raised loggia approached by a double flight of steps. Near it is the Loggia di S. Giovanni (1533) and the Torre dell Orologio, with the lion of S. Mark, built by Giovanni da Udine in 1527. From the Piazza the way up to the Castello leads under the Arco Bollani, designed by Palladio (1556). The ancient Castello, once the seat of the Patriarchs of Aquileia and then of the Venetian Lieutenants, now contains the Museo Civico. It has a good collection of pictures, including works by Carpaccio and other Venetian painters, among them Tiepolo. The latter painted for some time in Udine, and the frescoes in the Palazzo Arcivescovile are by his hand. The cathedral of the Annunciation was begun by the patriarch Bertoldo (1236) but has been much restored; it has a good Gothic portal and a fifteenth-century campanile.

Industry

Udine is an industrial centre in an agricultural district. Many branches of the textile industry are carried on here, the most notable being silk spinning and weaving, wool and hemp spinning, and the manufacture of cotton sewing thread. The Montecatini works

manufacture superphosphates, and tanning materials are made by S.A. Fabbriche Riunte Estratti Conceria. The timber industry is of some importance, parquet flooring, wood and wicker furniture being the chief products. There are also pasta factories, dairies making cheese, corn and flour mills, iron foundries, bell foundries, biscuit, cement, and shoe-leather factories.

Communications

Railways. Udine is on the main line from Venice to Vienna, double track from Venice to Udine, single-track electrified to the frontier at Tarvisio.

A double-track electrified line from Udine to Gorizia continues as a single-track electrified line to Trieste. Single-track lines run to Palmanova, junction for Cervignano and S. Giorgio di Nogaro, and to Cividale.

Tramways. Electric trams traverse the city, and there are tramways to Tarcento (electric) and S. Daniele di Friuli.

Roads. Udine is on road 13 from Tarvisio to Venice. Road 54 runs from Udine to Tarvisio via Cividale and Caporetto. Road 56 runs to Gorizia. Other main roads lead to Grado and Monfalcone.

Airfield. The Campoformido airfield is about $3\frac{1}{2}$ miles south-west of Udine.

URBINO. Altitude 1,480 feet. Latitude $43^{\circ} 43' N$. Longitude $12^{\circ} 38' E$. Population 5,459. Provincial capital. Seat of arch-bishopric. University.

Position and Site (Plate 23)

Urbino is built on the crest of a broad ridge extending east from the main chain of the Apennines between the Foglia on the north and the parallel Metauro on the south. This ridge is dissected laterally by the tributaries of both rivers and merges on the north-east into an indeterminate mass of hills extending to the Adriatic. The region is hilly, liable to landslips, and on the whole sparsely populated and barren, but the slopes round Urbino are well cultivated, as are also the valleys of the Foglia and Metauro. The main route from Florence, Arezzo, and the upper Tiber valley follows the Metauro valley and divides into two branches at Urbino. One branch crosses the ridge and descends to the Foglia valley and Pesaro. The other route continues along the Metauro valley to Fano, and, shortly east of Urbino, joins the main route south through the central basins of

the Apennines to Rome. Urbino is thus the main route junction and the administrative commercial and marketing centre for the region, although its importance has dwindled since it ceased to be the capital of an independent state.

The city stands about 1,000 feet above the Metauro valley and extends from north to south over the summit and upper slopes of a flat-topped hill. The strong natural defences of the site were strengthened by the walls and ramparts which still surround the city (Plate 23). The western slopes of the hill are broken by the small valley of a tributary stream of the Metauro. The main road (3) from the east approaches the city along this valley, and enters by the Porta Valbuona, while the western side of the city with its closely built houses and narrow streets (II, Plate 33) spreads like an amphitheatre up the steep slopes. Suburbs have extended along the main road to the west, and near the station (1,036 ft.) on the south, while scattered settlements dot the surrounding slopes (III, Plate 115).

History

Urbinum Hortense is mentioned by Pliny as a Roman municipium, but the city first rose to prominence at the end of the twelfth century when it became subject to the great Ghibelline house of Montefeltro. Buonconte da Montefeltro secured recognition of his power from both Pope and Emperor, being invested as Count of Urbino by Frederick II (1213) and receiving the title of Papal Vicar from Honorius III (1216). From their mountain stronghold the dominion of the Montefeltri spread on both sides of the Apennines to include Gubbio (1384), S. Leo, Senigallia, and Pesaro (1513). In 1443 Oddantonio received investiture from Pope Eugenius IV as Duke of Urbino. The Golden Age of Urbino was during the reigns of Federico (1444-1482) and his son Guidobaldo (1482-1508), when the city became one of the outstanding centres of Renaissance civilization. Federico was as keen a scholar as he was soldier. He used the wealth which he amassed as a condottiere to build a splendid palace and to collect a library superior, according to Vespasiano, to all other libraries whose catalogues he had seen, including 'that of the University of Oxford in England'. Guidobaldo shared his father's tastes, and the court presided over by him and his remarkable wife, Elisabetta Gonzaga, became a rendezvous of famous men and the setting of Castiglione's 'Book of the Courtier'. Guidobaldo was succeeded by his nephew Francesco della Rovere, but Leo X coveted the duchy for his own nephew Lorenzo dei Medici and della Rovere was driven

out (1517). He returned on Leo X's death (1522), but from that day the dukes resided for the most part at Pesaro; the great days of Urbino were over. On the death of the last della Rovere Duke in 1626 the duchy was incorporated in the States of the Church and the treasures of Urbino were taken to the Vatican.

Public Buildings and Monuments

The most conspicuous building in Urbino is the Palazzo Ducale described by Castiglione as 'a residence by many regarded as the most beautiful in Italy'. It is built of cream-coloured limestone, and the front has a loggia between tall flanking towers, which commands a magnificent view over the Apennines. Its chief architect was Luciano di Laurana, whom Duke Federico placed in charge of the work in 1465. Federico's study, panelled with intarsia work, the great staircase, and the richly carved doors and chimney-pieces are among the most attractive features of the palace. The rooms are now used as a museum and picture-gallery. In the Piazza Duca Federico there is a good statue of Raphael by Belli (1897), and the house in which Raphael lived was acquired for the city in 1873 as a memorial of its greatest citizen. The cathedral was begun by Laurana but has been largely modernized. The fourteenth-century church of S. Francesco, with its fine façade and campanile, contains the tombs of Raphael's father, Giovanni Santi, and Timoteo Viti, both painters of merit under whom Raphael began his studies. In the lunette over the entrance to S. Domenico is one of Luca della Robbia's best works. Urbino has a university, which now occupies the site of the first residence of the Montefeltri. A hospital is housed in the former convent of Sta. Chiara.

Industry

Urbino is a market for a fertile region producing cereals, mulberries, wines, and oils. Industry is not notable and there are only small silk spinning mills, a cutlery works, and a pasta factory. Traditional industries such as the making of lace and embroidery have some local importance.

Communications

Railway. There is a single-track line from Urbino to Fabriano, a station on the Ancona-Rome line. The station at Urbino is $1\frac{1}{2}$ miles from the city.

Roads. Road 73, which diverges from road 3 near Fossombrone,

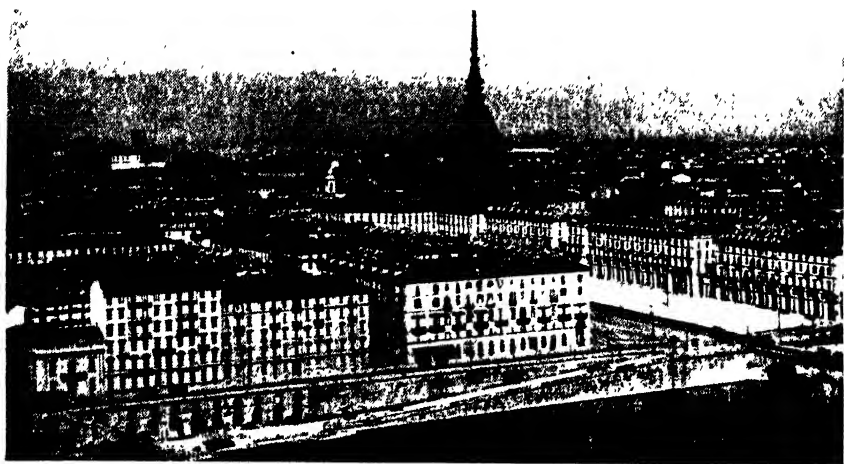


PLATE 22. *Turin*

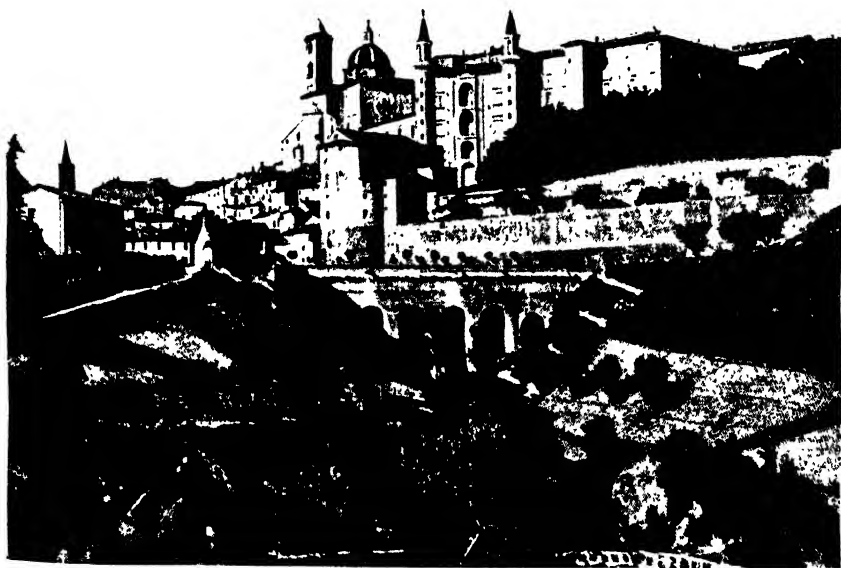


PLATE 23. *Urbino: the Palazzo Ducale*



PLATE 24. *Varese*



PLATE 25. *Viareggio*

passes through Urbino, and thence to Arezzo, Siena, and road 1. There is a main road to Pesaro, with a motor-bus service.

VARESE. Altitude 1,253 feet. Latitude 45° 49' N. Longitude 8° 50' E. Population 23,348. Provincial capital. Chamber of Commerce.

Position and Site (Plate 24)

Varese is an important route-centre and controls access to the wedge of territory between Lake Maggiore, on the west and north-west, and the Swiss frontier and Lake Lugano, on the north-east and east. Three main valleys converge on it from the north, cutting deeply into the limestone of the Western Lombardy Alps, which rise here to over 4,000 feet. The Val Cuvia provides a route from Luino on Lake Maggiore, the route from Ponte Tresa on Lake Lugano follows the Valganna, and the broad trough, forming the south-western extension of Lake Lugano, connects Varese with Porto Ceresio. Lying in the corridor between the limestone hills on the north and the morainic hills on the south, Varese also controls a route from Lake Maggiore on the west to Lake Como on the east. On the south the morainic hills rise to an almost uniform height of 1,300 feet, and routes through them to the Northern Plain are relatively easy.

The old town is situated about $1\frac{1}{2}$ miles to the east of Lake Varese where the Rio Vellore, a tributary of the F. Olona, provides it with a defensive water channel. From the small ancient nucleus Varese now spreads over the surrounding hills, and its outlying villas, gardens, and industrial suburbs have gradually encroached upon and incorporated neighbouring settlements.

History

Notwithstanding its modern appearance Varese can boast of considerable antiquity. In prehistoric times it was a centre of lake-dwellings and under the Romans a military station. During the ten years' war between Milan and Como (1117-1127) it sided with Milan and was twice taken and sacked by the Comaschi. It aspired to the position of a free commune, but was never wholly able to emancipate itself from the control of the Archbishop of Milan, and in the fourteenth century became part of the Visconti dominions. Henceforth its history is absorbed in that of Milan, save for a period in the eighteenth century when the Empress Maria Theresa granted it as a fief to Francesco d'Este, Duke of Modena (1765-1780). In May 1859 Garibaldi conducted one of his most brilliant campaigns round

Varese, defeating the Austrians under General Urban. Varese has developed greatly of recent years as a tourist centre and as the favourite *villeggiatura* of Milanese business families.

Public Buildings and Monuments

The Basilica of S. Vittore was rebuilt between 1580 and 1615 from the designs of Pellegrino Tibaldi and the tall campanile was added in the course of the seventeenth century. The adjoining baptistery of S. Giovanni dates from the twelfth century. The Palazzo Municipale was built by Francesco III, Duke of Modena (c. 1768), as his private palace, or Corte Ducale, and the Giardino Pubblico attached to it is a fine example of an Italian princely garden. Outside the town is the Sacro Monte, a place of pilgrimage owing its origin to St. Ambrose, who planned it as a thanksgiving for his victory over the Arians. The chapel at the summit was raised to the rank of a basilica in the seventh century and was enlarged and embellished by Lodovico Sforza, Duke of Milan. Under the inspiration of Cardinal Federico Borromeo the people of Varese collected funds to build, at successive stages of the ascent, fifteen chapels representing the Mysteries of the Rosary. These are decorated with wall-paintings by seventeenth-century Lombard artists.

Industry

Varese is an industrial centre with a great variety of small but important industries. The town has an engineering industry, employing 2,500 persons in 1931, and mainly manufacturing fighter aircraft, bicycles and motor-cycles, machine tools, and plant for textile mills. There are several tanning and boot and shoe factories, celluloid, comb and stocking factories, as well as silk mills. The city is an important centre of the furniture industry, which employs over 700 persons, and has besides a large paper mill which numbered 330 workers in 1939. Lesser industries include the manufacture of meat preserves, coffee substitute, wine, and liqueur, and milling and rice polishing.

Communications

Railways. A double-track electrified line from Milan to Varese continues as single-track electrified from Varese to Porto Ceresio (L. Lugano). A narrow-gauge electrified line runs from Varese to Ghirla, where it divides for Luino and Ponte Tresa respectively. From the Stazione Nord single-track lines run to Como, Laveno, Saronno, and double-track onwards to Milan (Nord).

Tramways. Electric tramways run to Angera, Azzate, Bizzozzero, Bobbiate, Masnago, and Prima Cappella, this last being the starting-point of funicular railways to the sanctuary of Sacro Monte and to Campo dei Fiori.

Roads. An autostrada connects Varese with Milan, whilst main roads lead to Milan (via Saronno), Como, Ponte Tresa and Luino, and Laveno.

Airways. The seaplane station of Idroscalo Civili Macchi is about 3 miles south-west of the city on Lake Varese.

VERCELLI. Altitude 427 feet. Latitude $45^{\circ} 18' N$. Longitude $8^{\circ} 27' E$.
Population 32,397. Provincial capital. Seat of archbishopric.

Position and Site

Vercelli lies on the west bank of the F. Sesia which flows south through low-lying meadows to join the Po. The city was probably founded to guard the easy crossing of the Sesia. It is chiefly important as a route centre and as an agricultural market for the surrounding plain. The ancient route from Turin to Milan, along the north of the Plain, crosses the Sesia at Vercelli, where it is joined by the main trans-Appennine route from Genoa through Alessandria to the Po crossing at Casale Monferrato. On the north there is easy access to several trans-Alpine routes, notably to those along the Val d'Aosta and the Val d'Ossola. Numerous roads converge from the Plain.

Vercelli stands on a low wooded terrace about 500 yards from the Sesia. The city is roughly pentagonal in shape and is limited on the north and east by the curving Colatore Cervetto, which flows into the Sesia on the south-east. The main and oldest part of Vercelli is encircled by avenues which mark the site of the ancient walls; modern suburbs have spread west near the railway station and south-east. Irrigated fields, mostly for rice growing, spread west and south and beyond the Sesia.

History

Vercellae was an important Roman municipium and a base for the struggle waged by the Romans against the Salassi of the Val d'Aosta. It was Christianized in the fourth century, its first bishop being S. Eusebio (340-370). It was the capital of a duchy under the Lombards, was ruled by its bishop in the tenth century, and in the twelfth century fought as a member of the Lombard League against the Emperor. Its peace was disturbed by bitter rivalry with the

neighbouring city of Novara; and by the feuds of its own noble families, the Guelf Avogadro and the Ghibelline Tizzini. In 1335 it acknowledged the lordship of the Visconti, but in 1427 Filippo Maria Visconti had to yield it to Duke Amadeus VIII of Savoy, whose interests clashed at many points with those of Milan. It was at Vercelli that Charles VIII of France made peace with the Italian League in 1495 and agreed to withdraw his forces from Italy. The hold of the Dukes of Savoy on the city was challenged at intervals by more powerful neighbours. Vercelli was occupied by the Spaniards from 1638 to 1659, by the French in the War of Spanish Succession, and again under Napoleon. After each occupation, however, it was restored to Piedmont.

Public Buildings and Monuments

The sixth-century campanile is all that remains of the ancient cathedral of S. Eusebio, and the present building dates from the sixteenth century. More important architecturally is the basilica of S. Andrea, dating from the early thirteenth century, with a fine façade and an interior distinguished by the slender Gothic columns of the nave. The older part of the Ospedale Maggiore belongs to the same period. In the sixteenth century Vercelli had an important school of painting, and the works of her principal artists are to be seen in the two museums of the city, Museo Borgogna and Museo Leone. G. A. Bazzi (1477-1549), better known as Sodoma, was a native of Vercelli, but most of his working life as a painter was spent in central Italy.

Industry

The city is primarily an agricultural market, owing to its position in the centre of a rich, fertile district. Rice is grown intensively in the neighbouring regions, and Vercelli is the principal rice market in Europe.

The city is also an industrial centre. Over one-third of the industrial population is employed in the textile industry, mainly in the Châtillon rayon mills. Several firms manufacture agricultural implements and machinery, whilst the Montecatini chemical combine have a factory making fertilizers and sulphuric acid. Parts for aircraft are also manufactured in the city, whilst the clothing industry is of some importance.

Communications

Railways. Vercelli is on the double-track line from Milan to Turin. From Santhia, a station on the Turin line, there is a single-track line

to Biella, providing direct connexion with Vercelli. There are single-track lines from Vercelli to Casale Monferrato and Valenza, thence double track to Alessandria, and to Mortara and Pavia.

Tramway. There is an electric tramway to Trino.

Roads. Vercelli is on road 11 from Turin to Milan and a short distance south of the autostrada between these two cities. Road 31 runs from Vercelli to Alessandria. Other main roads lead to Trino, Mortara, up the Sesia valley to Romagnano, and to Biella.

Airfield. There is a landing ground about a mile south of the city.

VERONA. Altitude 194 feet. Latitude $45^{\circ} 26' N$. Longitude $11^{\circ} 0' E$. Population 85,724. Provincial capital. Seat of bishopric. Chamber of Commerce. British Vice-Consul.

Position and Site

Verona, at the edge of the Northern Plain where the F. Adige emerges from the Alpine foothills, guards the important routeway along the Adige valley from central Europe, and the crossing of the river on the main highway from Venice to Milan. The valleys of the Adige and its tributary, the Isarco, separate the Central and Eastern Alps and afford the principal means of communication with the Northern Plain, not only from the eastern parts of the Central Alps and the western parts of the Eastern Alps, but also from the Brenner pass and central Europe. From Verona further routes diverge across the Northern Plain to Bologna, Mantua, and Parma. Verona, moreover, is midway on the main line of movement between Lombardy and Venetia, and it has been both a battleground between the two regions and a meeting-place for their cultures. This is borne out by the architecture and art of the city, where Venetian art with its Byzantine affinities is mingled with the Gothic forms more characteristic of Lombardy.

The site of the city is well chosen for defence. The city is built on a fairly flat gravel surface at the foot of the Tredici Comuni, which rise on the north from a height of 245 feet. The greater part of Verona is on the right bank of a bend of the Adige, which forms a natural defence against attack from the north and east. On the west and south the city is protected by the Canale Industriale and by city walls. Thus, much of the city is entirely surrounded by water, though part has spread to the eastern and northern side of the river where it is also protected by walls; outside these are the more modern suburbs

and the railway station of Porta Vescovo. The larger railway station of Porta Nuova is outside the city walls, immediately to the west of the Canale Industriale. The swift-flowing Adige is about 150–200 yards wide in Verona, and is crossed by eight bridges.

North of the city the southern slopes of the Tredici Comuni rise quite steeply to undulating hills cut into ridges by narrow south-flowing tributaries of the Adige. Farther north these hills, which are fertile and cultivated with vines, fruit, and chestnut trees, are succeeded by the Mi. Lessini (5,800 ft.). On the west Verona is separated from Lake Garda by undulating morainic hills, whilst to the south and south-east extends the fertile, cultivated Northern Plain.

History

The origin of Verona is obscure, but when the Romans first came there they found a town which had probably passed through Etruscan and Gallic hands. Under the early emperors Verona became a Roman colony, fine buildings sprang up and the town became one of the most prosperous in northern Italy. In A.D. 312 the Emperor Constantine, on his march from York to Rome, defeated the troops of Maxentius outside the walls. Verona was the favourite residence of Theodoric, King of the Goths, who built himself a palace there. In 573 it was the scene of the murder of the Lombard King Alboin by his wife Rosamunda. After its capture from the Lombards, by Charlemagne in 774, Verona grew and flourished as the principal residence of his son Pepin, and on the break-up of the Carolingian Empire Berengar I, King of Italy, made it his capital. In the tenth century Otto I, in order to secure firm hold over the Brenner pass, at that time almost the only road between Germany and Italy, took the Mark of Verona out of the kingdom of Italy and united it to that of Germany. Notwithstanding its peculiar link with Germany, Verona played a conspicuous part in the resistance of the Lombard communes to Frederick Barbarossa, and shared with them in the liberties secured by the Peace of Constance (1183). In the thirteenth century Verona fell under the power of the Ghibelline tyrant Ezzelino da Romano. When, in 1259, defeat and death freed the citizens from his oppressions, they chose one of their own number as their lord. This was Mastino della Scala, whose father, according to the chronicler Villani, made and sold the wooden ladders used for dressing the vines. The della Scala or Scaligeri ruled Verona for over a century, and the most glorious period of their ascendancy was the reign of Mastino's nephew Can

Grande I (1311-1329). Can extended his rule over Vicenza and Padua and attracted round him a brilliant court. Here Dante found a refuge and dedicated his *Paradisō* to his munificent host. In 1387 the last della Scala lord of Verona fell before the advancing power of Gian Galeazzo Visconti of Milan, and in 1404 the city finally lost its independence to the republic of Venice. Except for an interval during the war of the League of Cambrai (1509-1517), when it was occupied by the Emperor Maximilian, Verona remained in Venetian hands until the coming of Napoleon. By the Treaty of Lunéville (1800) it was divided into two parts, the right bank of the Adige being assigned to the French and the left to the Austrians, but in 1804 the whole city was included in Napoleon's 'Kingdom of Italy'. At the Congress of Vienna (1815) it was handed over to Austria to become the chief bulwark of the strategical system known as the 'Quadrilateral', which included the fortresses of Mantua, Peschiera, and Legnago (II, p. 122). After the battle of Magenta (1859) it became part of United Italy.

Public Buildings and Monuments

Verona is rich in Roman remains, of which the most important is the Arena or Amphitheatre. Standing in the centre of the city, it is the largest in existence after the Colosseum, and is in excellent preservation. Two gateways, the Porta dei Borsari and the Porta de' Leoni, which formed part of the Roman system of fortification, are still extant, and a theatre on the left bank of the Adige is in process of excavation. The picturesque Piazza della Erbe, now a fruit and vegetable market, was once the Roman forum. Among medieval monuments the church of San Zeno is one of the finest Romanesque churches in Italy. The cathedral dates from the twelfth century. The tombs of the Scaligeri outside the church of Sta. Maria Antica form an interesting group. That of Can Grande della Scala, surmounted by his equestrian statue, is described by Ruskin as 'the consummate form of the Gothic tomb'. The Ponte Scaligero is an imposing battlemented bridge of the fourteenth century. Adjoining it is the Castelvechio, built by Can Grande, and now used as a picture gallery. Here and in some of the principal churches are examples of the work of Veronese painters such as Altichieri (c. 1330-1395) and Girolamo dai Libri (1474-1556). The Veronese architect Michele Sanmicheli (1484-1559) may be considered the father of the science of modern fortification. His work survives in the Porta del Palio, the Porta Nuova, and in a considerable section of walls, as well

as in numerous palaces. The modern fortified barracks standing on high ground on the left bank of the Adige, on the site of the former Castel San Pietro, bear witness to the continued importance of Verona as a military stronghold.

Industry and Commerce

Verona is in a good position to act as a market and place of exchange for the commodities produced in the Adige valley and on the Northern Plain. The valley of the Adige is one of the most fertile of Alpine valleys and has much produce to market, whilst the Northern Plain south of the city is also intensively cultivated. It is, therefore, not surprising that Verona has developed as a very important agricultural centre and a collecting place for silk cocoons. On the second Monday of March each year a cattle and agricultural fair, lasting a week, is held, the only one of its kind in Italy. The majority of Verona's industries are connected with agriculture, and include the manufacture of agricultural machinery, nails and iron hoops, and wine, the treatment and tanning of skins and hides, and the preparation of sausages. There are also cotton mills, mainly for hosiery, silk and hemp-spinning mills, several paper and pulp mills, a boot and shoe factory, and chemical works manufacturing oxygen.

Communications

Railways. Verona, an important junction on the main line from Milan to Venice (double track), is here crossed by the main line from the Brenner pass to Bologna. The latter is double-track electrified to the north of Verona, but only single-track electrified southwards to Bologna. The traffic of these two routes is interchanged at Porta Nuova station, which is also the junction for the lines to Legnago and Rovigo and to Mantua and Modena. These last two lines are double track as far as Dossobuono, where they diverge and become single track. Verona S. Giorgio station is the terminus of the electric railway to Affi, the junction for Caprino and Garda, and Verona Porta Vescovo is a station on the Milan-Venice line.

Roads. State roads converge on Verona from the Brenner pass, Bolzano, and Trento (12), from Milan and Brescia (11), from Venice, Padua, and Vicenza (11), from Modena (12), and also from Parma and Mantua (62). There is in addition a dense network of local roads.

Tramways. The centre of the city and the suburbs are served by electric tramways. The Porta Vescovo tramway station is the terminus

of narrow-gauge lines to Grezzana, Tregnano, Sambonifacio, and S. Giovanni Ilarione.

Waterway. The Adige is navigable in parts up to Bolzano.

Airfield. The Settimo airfield is 4 miles north-west of Verona.

VICENZA. Altitude 131 feet. Latitude $45^{\circ} 33' N$. Longitude $11^{\circ} 34' E$. Population 48,279. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site

Vicenza, situated in the Venetian Plain on both banks of the F. Bacchiglione at the confluence of the F. Retrone, guards the eastern end of the fertile corridor between the limestone hills of the Mi. Lessini on the north and of the Mi. Berici on the south. Vicenza thus controls the main routeway along the northern edge of the Plain between Lombardy and Venetia, a route which is crossed at Vicenza by the ancient trade route between Venice, Padua, and the Alps. The importance of the city was therefore early established. Moreover, Vicenza marked the limit of navigation on the F. Bacchiglione, which below Padua is linked with the Laguna Veneta by canal. This waterway formerly carried a considerable traffic. Vicenza has maintained its importance as the converging point of major and minor routes across the Plain and from the Alps, and as an industrial centre and market for the surrounding well-cultivated lands.

Vicenza lies at the north-eastern base of the Mi. Berici, and the main part of the city is enclosed by the Bacchiglione on the north and east, and by the Retrone on the south. The two rivers form an irregular angle, for the Retrone approaches the western bank of the Bacchiglione so closely that only a narrow strip of land separates them before they unite. Water was the main factor in the ancient defences of the city, which were circular in shape and surrounded by a moat. The city gradually spread all round the original nucleus and beyond both rivers, chiefly over the level land between them on the west, but also on the south near the railway station, up the green slopes of the Mi. Berici to the church of Madonna del Monte (404 ft.), and north and east beyond the Bacchiglione.

History

A town on this site was taken from the Gauls in 177 B.C. and became the Roman Vicetia, which attained to the status of a municipium. After being the seat of a Lombard Duke and a Frankish

Count it came under the control of its own bishop and emerged in the twelfth century as a free commune. This was the period of Vicenza's greatest prosperity, as the thirteenth century saw the end of her independence. She failed to establish a native despotism and became an apple of discord between neighbouring Guelf and Ghibelline nobles. Members of the houses of Este and Romano in turn held the post of Podestà, and, after the fall of Ezzelino da Romano, Padua assumed control. Can Grande della Scala conquered Vicenza in 1311, in 1387 she fell to Visconti, and at last, in 1404, found peace and security under the rule of Venice. During the war of the League of Cambrai, the city was occupied in the Emperor's name by one of her own nobles, Leonardo Trissino, a penniless exile who hoped by this expedient to recover his fortunes. Vicenza allowed Trissino to take possession without a struggle, but after he had been taken prisoner by the Venetians at the siege of Padua, she thought better of her action and returned to the Venetian fold. The story of Trissino's adventure is told by another Vicentine noble, Luigi da Porto, whose *Lettere Storiche* are a valuable historical source for the period and whose novel provided Shakespeare with the plot of Romeo and Juliet. The battle of Vicenza, on 10 June 1848, followed the rising of the citizens against Austria. On their refusal to submit, the enemy attacked with greatly superior forces; the Austrians took Monte Berico, from whence their artillery commanded the city, and General Durando was forced to capitulate.

Public Buildings and Monuments

The chief artistic feature of Vicenza are the works of her illustrious architect, Palladio (1508-1580). In the Piazza dei Signori is his masterpiece, known as the Basilica, formed of colonnaded porticoes in the classical style encircling the fifteenth-century Palazzo della Ragione (II, Plate 19). The Loggia del Capitano, in the same Piazza, is also by Palladio. Among other buildings in this remarkable group are the lofty Torre del Orologio, dating from the twelfth century, the Renaissance Palazzo del Monte di Pietà, the Lion of St. Mark on his column (1464), and a modern statue of Palladio. The cathedral is a twelfth-century foundation but has undergone many alterations in which Palladio has had some share; it contains frescoes by the principal artist of Vicenza, Bartolomeo Montagna (1460-1523). The Corso Principe Umberto is lined with fine palaces of the Vicentine nobility dating from the fifteenth to the eighteenth century. At the end is the Palazzo Chiericati, an excellent specimen of Palladio's work, which

now contains the Museo Civico. Not far away is the Teatro Olimpico which Palladio built at the request of the Academy of Vicenza for the representation of classical drama. Vicenza has several interesting churches, among which is Sta. Corona, built in 1260, some say as a thank-offering for the extirpation of the hated race of Romano. Outside the city is the sanctuary of the Madonna di Monte Berico, built in 1428, to commemorate an apparition of the Blessed Virgin, and subsequently enlarged. It is approached either by a flight of steps starting from a Palladian arch outside Porta Monte, or from Porta Lupia by a portico with 150 arches, symbolizing the beads of the Rosary. Outside the church the Piazzale della Vittoria was opened in 1924, as a memorial of the War of 1915-1918. On the slopes of Monte Berico is the villa of the Rotonda, one of Palladio's most celebrated works.

Industry

Vicenza is an important agricultural market through which pass most of the products of the region, including grain, vegetables, fruit, poultry, eggs, butter, cheese, timber, grapes, wine, and hemp. The textile industry is important, and the city is a centre for the collection of silk cocoons. There are silk-spinning and weaving mills, a large cotton-stocking factory with 58,000 spindles and 1,180 looms, small hemp-spinning mills, and numerous woollen mills, the largest of which belongs to Lanificio Rossi.

The Acciaieria e Ferriera Vicentina is an important iron and steel works, whilst electrical signalling apparatus and agricultural machinery are also made. There are also fancy-glass, brick, tile, and earthenware works, and paper mills and paper-goods factories. Chemical works make pharmaceuticals, insecticides, and superphosphates; there are candle and soap works, brandy distilleries, flour mills and pasta factories, and artistic furniture and cask works. The city is well known for its gold and silver work and for the manufacture of musical instruments, whilst wine is produced locally.

Communications

Railways. Vicenza is on the main double-track line from Milan to Venice. The line from Vicenza to Treviso is also double track and a single-track line for Bassano del Grappa and Trento diverges from it at Cittadella. The line to Schio is double track as far as Thiene and single track beyond.

Tramways. Electric trams traverse the city. There are steam tramways to Marostica and Bassano, Montagnana, and Recoaro; the

Recoaro line at Montecchio S. Vitale has a branch to Arzignano and Chiampo.

Roads. Vicenza is on road 11 from Venice to Turin. Road 53 goes from Vicenza to Treviso and Portogruaro, and road 46 to Rovereto and Trento. Other main roads lead to Bassano, Asiago, Recoaro, and Montagnano.

Airfield. There is an airfield about 2 miles north-north-west of the city.

VITERBO. Altitude 1,073 feet. Latitude $42^{\circ} 25' N$. Longitude $12^{\circ} 7' E$. Population 21,281. Provincial capital. Seat of bishopric.

Position and Site

Viterbo stands on the north-western slopes of the Mi. Cimini, at the edge of the volcanic plateau which extends north to the foot of the Mi. Volsini. The plateau is deeply dissected by valleys which lead steeply down to the Tiber on the east and more gradually to the coast on the west. This is, for the most part, a sparsely populated and macchia-covered region, but the immediate vicinity of the city is fairly well cultivated with olive groves, fields, and vineyards for which Viterbo is the marketing centre and the focus of minor routes. The main road from Rome to Siena and Florence is crossed at Viterbo by routes between the coast and the Tiber valley.

The deeply dissected slopes of the plateau west of Viterbo provide natural defences for the town which is protected on the east and south-east by shoulders (2,600 ft.) of M. Cimino (3,455 ft.). The original site, now marked by the cathedral of S. Lorenzo, was within the angle of confluence of two west-flowing tributaries of the Marta. Medieval walls, with seven gateways, still enclose the main part of the town, which extends beyond both streams. Towers, palaces, and narrow twisting streets characterize Viterbo. The town is roughly triangular in shape and slopes up from Porta Faul on the west (c. 985 ft.) towards the railway (1,152 ft.) on the east and beyond through outlying suburbs (1,190 ft.—1,225 ft.) on the lower slopes of M. Cimino.

History

Viterbo marks the southernmost advance of the Lombard King, Desiderius, who, in 772, threatened Rome from here until he was recalled to Pavia on the appearance of Charlemagne. Some of his soldiers remained behind, and from them the present inhabitants of

Viterbo claim a Lombard ancestry. Charlemagne recognized Viterbo as a papal city and its history is interwoven with that of the Papacy. It was the favourite refuge of the popes when republican unrest forced them to fly from Rome. Here, in 1155, the Englishman, Pope Hadrian IV, met the Emperor Barbarossa and insisted that he should hold his stirrup as a sign of vassalage. Later, Barbarossa made Viterbo the seat of the anti-pope Paschal III (1164-1168). Several papal conclaves were held here during the thirteenth century, notable among them being that which elected Gregory X after sitting for two years and ten months (1268-1271). In 1271 the church of S. Silvestro was the scene of the murder of Henry, son of Richard Earl of Cornwall and nephew of Henry III, by Guy, son of Simon de Montfort, in revenge for his father's death at Evesham (1265). The murdered man's heart was taken to England in a casket, and Dante points out Guy in the *Inferno* as 'he who pierced the heart which is still venerated on the Thames'. Feuds of local families, notably the Gatti, the Tignosi, and the powerful Ghibelline house of di Vico, kept Viterbo in constant ferment. The office of Prefect of Rome was for long hereditary in the di Vico family. In the fourteenth century Giovanni di Vico ruled over a territory which included not only Viterbo but Civitavecchia, Orvieto, and Todi, until his power was overthrown by Cardinal Alborno. The last prominent member of the family was Giovanni who, in 1434, was defeated and beheaded by Cardinal Vitelleschi. From this time Viterbo remained under papal authority until Italian troops occupied it in September 1870.

Public Buildings and Monuments

Viterbo is a typical medieval city with walls and gates, palaces, churches, and fountains, dating principally from the twelfth and thirteenth centuries. Some of the churches are built on the sites of Roman temples, and the Ponte del Duomo, which spans the lower portion of the city, has Etruscan foundations. The Piazza S. Pellegrino, in the poor quarter of the town, affords an almost unspoiled picture of thirteenth-century Italy. The cathedral of S. Lorenzo was built in 1192 and has a fine fourteenth-century campanile. Near it is the Palace of the Popes (1266) with an elegant Gothic loggia. The former church of Sta. Maria della Verità now houses the Museum. Here, in the Capella Mazzatesta, are frescoes by the local artist, Lorenzo da Viterbo (1469), which are of considerable merit and interest. The Gothic church of S. Francesco contains the tombs of two thirteenth-century popes, Hadrian V and Clement IV. The

Piazza della Fontana Grande is named after the beautiful fountain begun in 1206.

Industry

Viterbo is an important agricultural market in a notable wine-growing region. Most of the town's industries are connected with local products. There are three distilleries, mainly for liqueurs, olive-oil presses, a sulphur-oil factory owned by S.A. Gaslini, pasta factories, an important foundry, a factory for agricultural machinery, and several pottery works, as well as small cotton and woollen mills. Leather working is also notable.

Communications

Railways. There is a single-track line from the Porta Fiorentina station to Attigliano on the main line between Florence and Rome. A single-track line serving both the Porta Fiorentina and the Porta Romana stations goes to Rome via Capranica. An electric railway from Viterbo Nord station goes to Rome via Civita Castellana.

Roads. Viterbo is on road 2 (Via Cassia) from Rome to Florence; at Montefiascone road 71 branches off for Orvieto, and at Vetralla road 1-bis branches off for road 1 and Tarquinia (also on road 1). Other main roads lead to Tarquinia via Tuscania and across the Mi. Cimini to rejoin road 2 near Montorosi.

Airfield. There is an airfield about 4 miles north-west of the town beside road 2.

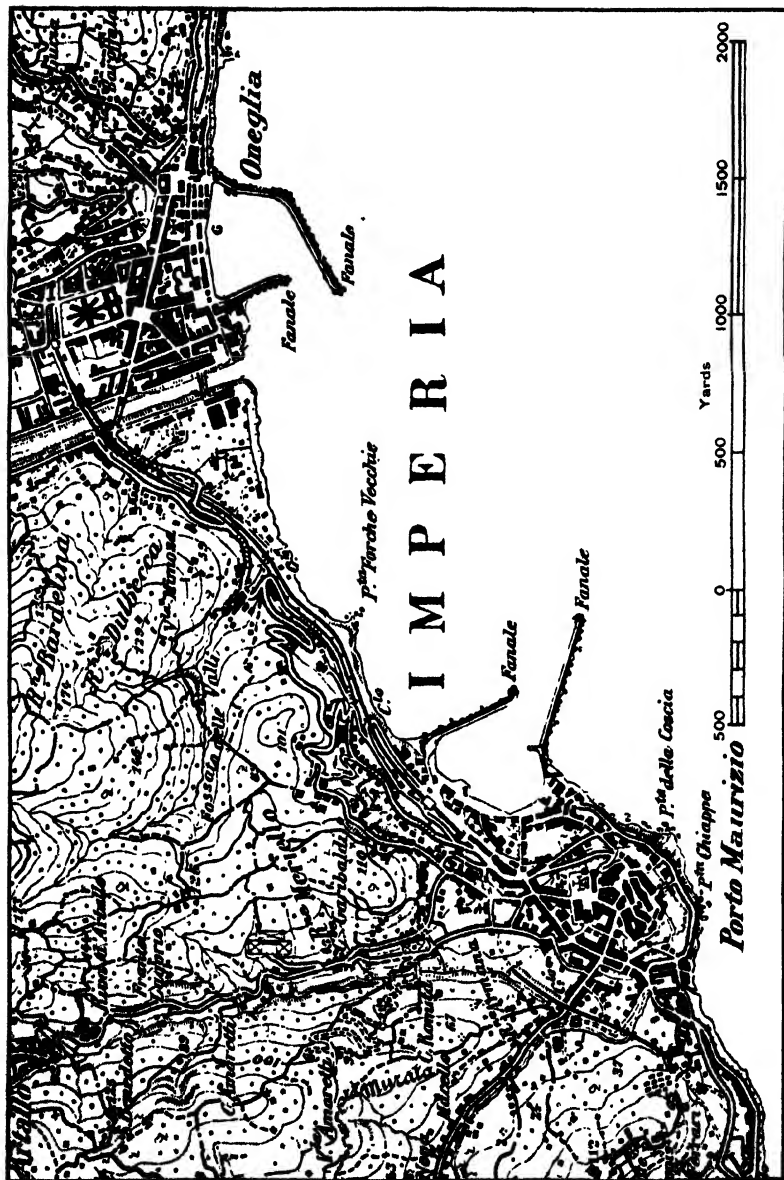


FIG. 9. Imperia

CHAPTER XXII

GAZETTEER OF PORTS

ONLY the more important ports of the mainland of Italy and Sicily are described in this chapter, the lesser ports and more important landing-beaches being distinguished in Chapter III. In order to obtain uniformity of treatment in both chapters the ports are here described in sequence from the French frontier round the coast of Italy to the Yugoslav frontier, together with the Sicilian ports and Zara at the end. The ports of Sardinia and of the other islands are described respectively in Chapters XXIII and XXIV, and a general account of the mainland ports is given in Chapter XIII. Damage to cities and works of art in the war of 1940-1945 is noted in Appendix I. Numbers in the text refer to the plans of the port under consideration. In pronouncing Italian place-names, the accent as a rule falls on the penultimate syllable, e.g. Ravénna, and is not marked in this chapter. Exceptions are, however, indicated thus: Rímini.

It is useful to remember that the tidal range in the Mediterranean is slight and that the difference between high and low tides is seldom more than 2-3 feet.

IMPÉRIA. Latitude $43^{\circ} 53' N$. Longitude $8^{\circ} 2' E$. Population, 20,916.
Provincial capital. Chamber of Commerce.

Position and Site (Fig. 9)

Imperia, which was formed in 1923 by the amalgamation of the communes of Porto Maurizio (Imperia Ponente) and Oneglia (Imperia Levante), is on the western side of the gulf of Genoa and only about 25 miles east of the French frontier. The new name was taken from the T. Impero, one of the larger torrents of the Ligurian coast, which flows into the sea between the two towns immediately west of Oneglia. On either side of the T. Impero north-to-south ridges of the Maritime Alps rise straight from the sea.

Porto Maurizio is at an altitude of about 200 feet and stands on the seaward end of a spur which rises to about 1,000 feet at M. Rosa 2 miles inland. This spur is cliffed on its southern and south-eastern sides but slopes somewhat more gently on the east to the port of Porto Maurizio.

The main part of Oneglia is situated on a level strip, about 500 yards wide, to the east of the mouth of the T. Impero, whilst the

industrial section of the town continues northwards up the valley for about 1 mile. The crest of the ridge forming the eastern flank of the

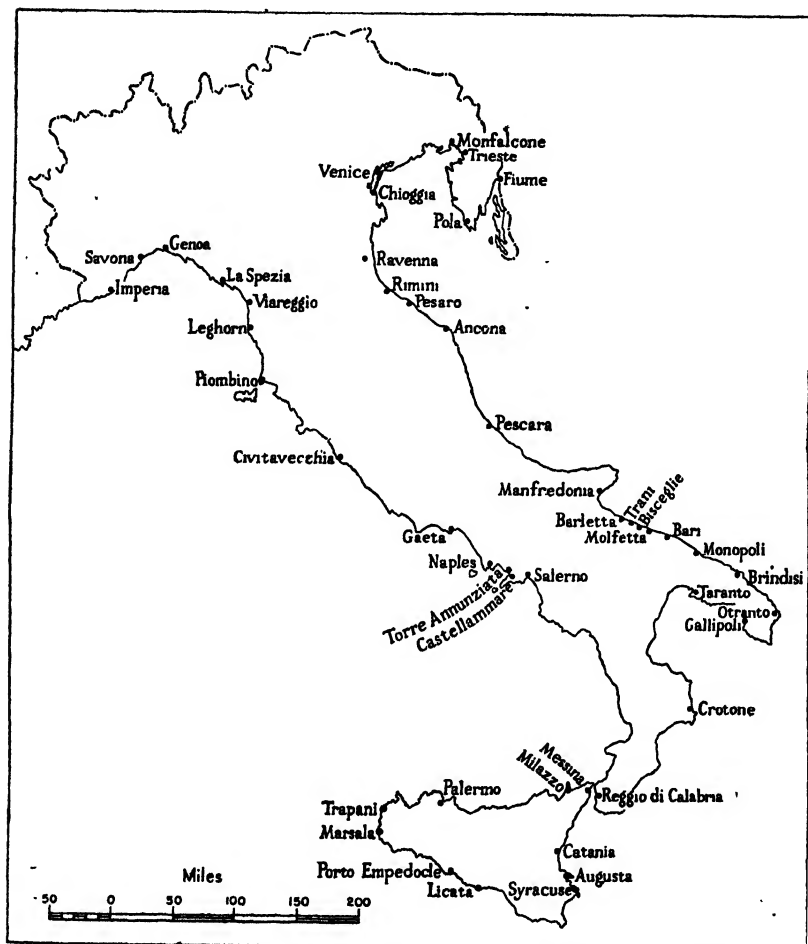


FIG. 10. *Major Ports*

valley attains heights of about 650-800 feet within 1 mile of the town. To the east of the harbour the coast immediately becomes rocky and rises more steeply inland.

History

Oneglia was a fief of the Doria family, and the birthplace of the famous Admiral Andrea Doria (1466-1560), who played a prominent

part in the wars of Charles V and Francis I. In 1576 it was sold to the Duke of Savoy, and although occupied at different times by Genoa and Spain, it continued to be recognized as a part of Piedmont.

Porto Maurizio has no history apart from that of Genoa, of which it was a dependency.

Public Buildings and Monuments

The fine eighteenth-century cathedral of S. Maurizio dominates the promontory on which Porto Maurizio stands. A road, $1\frac{3}{4}$ miles in length, now joins the two cities, and along it the chief public buildings of Imperia are being erected.

Industry

Imperia is the centre of the Ligurian olive-growing region and has olive presses for locally grown olives as well as large refineries both for local oil and for oil imported from other parts of Italy. The important S.A. Gaslini has a refinery in the town, whilst the Sasso company and Oleificio Amoretti own the largest oil presses. Other industries are of lesser importance, though there are big cement works, one of which belongs to Italcementi, several large flour-mills, and factories for boots and shoes and tin boxes.

Description of Port

The port of Imperia consists of the two ports of Porto Maurizio and Oneglia. The ports, which are about a mile apart, are both artificial harbours and the approaches are free from obstructions. The former is well protected against all except south-east winds, but these send in heavy seas: the latter suffers most from south-west winds, but is partially protected by the harbour works of its neighbour. There is anchorage between the two ports, but it is unsafe with southerly winds, and a large area is reserved for seaplanes.

Porto Maurizio. The harbour lies to the north-east of the spur on which Porto Maurizio stands. It is formed by two breakwaters with masonry shelter walls on broad foundations of rubble. The shorter, the Molo Nord, curves from the shore in a south-south-easterly direction for some 920 feet. The longer, the Molo Sud, is curved at its root with a small spur (80 ft.) jutting into the harbour. It then runs east-south-east for 2,250 feet, overlapping the Molo Nord by 1,800 feet. The entrance to the harbour faces south-east between the two breakwaters and is about 360 feet wide with a depth of 26 feet. The total water area of the harbour is 22 acres, of which slightly over

one-half has depths of more than 22 feet. Quays extend round the west and north-west sides of the harbour, but depths on the former are very small, and cargo is only handled at the latter. This, the Calata Principe Tomaso, is some 1,000 feet long with depths alongside from 18 to 24 feet. Vessels moor stern-to. There are two warehouses and one open-sided shed. Water is laid on, and a small stock of coal is held. Small craft can be secured stern-to along the Molo Nord.

Oneglia. The harbour, which is roughly triangular, lies south of the town and is slightly larger than its twin. It is protected by two breakwaters constructed on the same principles as those at Porto Maurizio. That on the west, the Molo Ovest, is gently curved and projects about 600 feet from the shore in a south-south-easterly direction. The longer breakwater, the Molo Est, is dog-legged: it extends 900 feet south-by-west from the shore and then turns south-west for another 1,200 feet to overlap the Molo Ovest. The harbour entrance faces south-west and is 330 feet wide with an effective channel 130 feet wide and 27 feet deep. Three-quarters of the harbour is dredged to depths between 18 and 26 feet. The northern half of the Molo Ovest is quayed, as is the whole northern side of the harbour, the Calata Gian Battista Cuneo. There is, therefore, a total of about 1,700 feet of quay alongside of which vessels can berth. Depths are variable. Additional accommodation is available for 4 or 5 small vessels stern-to along the Molo Est. A small stock of coal is normally maintained and water is laid on to the Calata Gian Battista Cuneo and Molo Ovest. On the former is an open-sided shed, and there is a small slipway (width about 50 ft.) at its eastern end. The latter has a warehouse and a double rail-track, not flush, from which a single line connects by turntables through the western part of the town to the main line. Two travelling cranes are used for unloading coal on this quay. Small repairs can be effected.

Trade and Connexions. Imports are mainly coal, timber, cement, foodstuffs, cotton, and timber, while olive oil, sulphur oil, and soap are the chief exports. Flowers are dispatched, mainly by rail, to Northern Italy, France, and Switzerland. The Fiume-Valencia service calls at Imperia and provides a weekly connexion with Savona, Genoa, and other Italian ports, and with Marseilles.

Inland Communications

Railways. Imperia Porto Maurizio and Imperia Oneglia are two stations on the main electrified line from Ventimiglia to Genoa. An electric tram connects Porto Maurizio with Oneglia.

Roads. Coast road 1 passes through Imperia, where road 28 by the Nava pass branches to Turin.

SAVONA. Latitude 44° 18' N. Longitude 8° 29' E. Population 57,354. Provincial capital. Seat of bishopric. Chamber of Commerce. British Vice-Consul.

Position and Site (Fig. 11)

Savona is at the foot of the steep Ligurian Alps and Apennines where they adjoin. Much of the city's commercial and strategic importance is due to its position at the seaward end of the Letimbro valley, which gives direct access to the important routeways using the Cadibona pass, the lowest, across the Ligurian mountains. Savona is at the northern end of a narrow strip of cultivated lowland which curves gently in a north-easterly direction from Vado Ligure. North-east of the city the coast becomes rockier and the Ligurian Apennines rise very steeply inland. Savona itself is immediately dominated on the north by the Capuchin monastery on its hill (249 ft.) and on the north-west by the hill crowned by the Forte Madonna degli Angeli (c. 660 ft.).

The medieval and renaissance part of the city with its congested alleys and streets is built round the western shores of the small natural harbour. This is protected from the open sea by the low south-west to north-east ridge (up to 60 ft. high) with the Fortezza at its base. This ridge has in recent years been artificially extended north-eastward to increase the area of the harbour. The nineteenth-century part of the city, which has wide streets arranged in a rectangular grid pattern, has spread on to the alluvial flat alongside the east bank of the T. Letimbro near its mouth. The most modern part, however, extends for over a mile up the Letimbro valley, whilst scattered residential suburbs have climbed up the hill-slopes north of the old town and east of the modern. The principal industrial area, dominated by large iron and steel works, is on the Fortezza ridge. On the west bank of the Letimbro, however, there are some scattered industrial buildings, whilst Vado is also an industrial suburb.

History

Savona first appears in history in 205 B.C. as the ally of the Carthaginians in their war against Rome. Under the Empire it became a flourishing and wealthy seaport, fighting strenuously against the barbarian invaders until, in A.D. 641, it was conquered by the Lombard

King Rothari and reduced to poverty and temporary insignificance. In the tenth century it fell to the Marquis of Aleramo, from whose family sprang many of the noble houses of Liguria, and whose descendants helped to imbue the Savonese seamen with the fighting spirit which distinguished them in the Crusades and in combats with pirates at home. By the eleventh century Savona had won its liberty and was ruled as an aristocratic commune headed by the local family of Carretto. Genoa, at one time a protector, became a bitter enemy, and Genoese exiles could count upon an asylum in Savona. When the democratic party in Genoa rebelled against Louis XII in 1507, the nobles of the French party took refuge in the rival city. In the same year Louis XII chose Savona as the meeting-place between himself and Ferdinand of Aragon, and French and Spanish captains, who had fought each other in the Neapolitan war, met here in peace and friendship, while the two monarchs laid plans for a joint attack on Venice. In 1528 a French scheme for making Savona a rival port to Genoa led to the final subjection of the smaller city to the greater. Andrea Doria went over to the side of the emperor, taking Genoa with him, and conquered Savona, destroying the port and building a fortress. Among the most distinguished citizens of Savona are the two great Renaissance popes, Sixtus IV and Julius II, both members of the old Ligurian family of della Rovere. During the nineteenth century Savona had two famous prisoners, Pope Pius VII, sent there by Napoleon in 1809, and Giuseppe Mazzini, imprisoned in the fortress for three months by the Austrians in 1830, and then released owing to lack of evidence against him.

Public Buildings and Monuments

The cathedral was finished in 1602 except for a fine nineteenth-century façade. The sumptuous woodwork of the choir was the joint gift of Giuliano della Rovere, afterwards Pope Julius II, and the commune (1500). In the adjoining Capella Sistina, erected by Sixtus IV in memory of his parents, is a magnificent marble tomb with figures of Sixtus and his nephew, Giuliano, by Michele and Giovanni de Aria of Como. The half-finished palace built for Julius II by Giuliano da Sangallo is now the Prefettura. Overlooking the sea is the Torre di Leone Pancaldo, called after a native of Savona who acted as pilot to Magellan on his voyages of discovery. The sixteenth-century *Fortezza* is used for industrial purposes; it bears an inscription commemorating Mazzini—'the prisoner who prepared the way for Young Italy'. The handsome Teatro Chiabrera (1853) is dedicated to the

memory of the poet of Savona, Gabriello Chiabrera (1552-1638). In the Museo Civico is a small but interesting picture-gallery.

Industry

The most important industrial plants in Savona are grouped around the port area. Here there are the large Ilva iron and steel works and the smaller Servettaz-Basevi plant, which also includes general engineering shops. On the north-west shore of the port is the coal-handling plant from which coal is sent to the coke ovens at S. Giuseppe di Cairo by an aerial ropeway. The Ilva iron and steel works has a total annual steel capacity of 150,000 tons and manufactures various profiles, rails, sheet iron, pipes, steel and bronze castings, gun barrels, alloys, &c. The food industry is also notable, and there are numerous pasta factories, flour mills, and establishments making crystallized fruits. Chemicals (oxygen, nitrogen, acetone from cereals, and molasses), fish nets, glass bottles, ceramic products, earthen and stone ware, and cycles are manufactured, whilst there are tanneries and establishments making tanning extract.

At Vado Ligure, west of the port of Savona, there are large industrial plants. Among them is a chemical factory, the only Italian ammonia plant using hydrogen from coke-oven gas, which produces synthetic ammonia, sulphuric acid, and sulphate of ammonia for agriculture. There are besides important coke ovens, an electrical engineering plant making electric locomotives and other heavy engineering products, an Ilva rolling mill, the large S.A. Montepioni plant for treating zinc ore, an oil refinery, and a factory manufacturing sheet tin and tin containers for the canning industry.

Description of Port

The harbour lies to the north-east of the town and has been developed primarily to import coal for the industries of Turin and western Piedmont. It is open to the north-east, contains about 80 acres of water, and consists of an outer harbour giving access to a triple inner harbour. The whole is bounded on the north-west by the shore, while the exterior defences are formed by a breakwater about $\frac{3}{4}$ mile long, built roughly parallel to the shore north-north-east and then north-east in two almost equal legs from Punta S. Erasmo, and by the Molo Sottoflutto projecting at right-angles from the shore almost opposite the end of the outer breakwater.

Outside the harbour are three piers: one projects from a short groyne immediately west of the mouth of the T. Letimbro, while the

other two are wooden piers serving the Ilva steel works. The Molo Luigi Razzo (984 feet), at right angles to the shore near the centre of the southern leg of the outer breakwater, was part of the original harbour works.

The approaches to the port are free of obstruction, and there is safe anchorage, except with a south-east wind, east and north-east of the entrance in the Rada di Albisola. There is no room inside the harbour for a swinging berth.

The Avamporto (1) is roughly rectangular, being bounded on the south-west by the Molo Miramare, on the north-west by the unquayed shore, on the north-east by the Molo Sottoflutto, and on the south-east by the broad Molo Paolo Boselli¹ and its narrow extension the Molo Frangiflutti. The entrance is between this last and the Molo Sottoflutto and is 900 feet wide with depths of 33 feet in mid-channel. The basin has depths of about 30 feet in the centre, shoaling shorewards, while the passage to the inner harbour, which is some 450 feet wide between the Molo Miramare and the Molo Paolo Boselli, has depths of 29 feet in mid-channel. A narrow jetty, 200 feet long, has recently been constructed 195 feet east of the Molo Miramare, and between them is a small boat camber with a beach at its head. Quays are 8 feet high on the outer breakwater and about 10 feet high on the two moles projecting from the shore.

The inner harbour is divided into three basins by the broad mole which ends in the Calata del Carbone. To its east is the Darsena Vittorio Emanuele (2), to its north Porto Vecchio (3), and to its west the Darsena Vecchia (4). Quays extend round all three, except the north-west side of the last, which is flanked by the new main coast road, built partly on a viaduct some yards from the shore. Quays are $5\frac{1}{2}$ feet above high water in the Darsena Vecchia and elsewhere 8 feet.

The entrance to the Darsena Vittorio Emanuele is 270 feet wide with depths of about 29 feet. The basin is irregular in shape, and depths vary between 26 and 31 feet. The Darsena Vecchia is the oldest part of the harbour and is now only used by small craft or vessels lying up. There are no facilities for unloading. Porto Vecchio is about 1,800 feet long tapering south-west to some 300 feet wide at its inner end, and has depths of 35 to 28 feet, shoaling inwards. On the Calata del Carbone, which forms its south side, is the main warehouse of the port, and most of the trade in this basin is in general

¹ The southern leg of the Molo Paolo Boselli, facing west, is strictly part of Porto Vecchio.

merchandise. In the north inside the Molo Miramare, however, is the most important installation of the harbour, the Funivie coal-handling plant. This consists of a detached concrete jetty carrying special equipment for the rapid unloading of vessels lying alongside, and, on the shore, a coal silo of considerable capacity with facilities for unloading lighters direct into its bins. Both are connected by aerial ropeway with each other and with S. Giuseppe di Cairo, 12 miles inland, whence coal is distributed by rail to western Piedmont.

Ships normally berth alongside in the inner harbour, except at the head of the Calata del Carbonne.

No.	Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
1	<i>Avamporio</i>				
	Molo Sottoflutto . .	..	860 inside 740 outside	—	4 small spurs on the inner face.
	Molo Miramare . .	1-13	335	—	Boathouses along east side. Loading and discharging from tankers moored stern-to.
	Molo Frangiflutti . .	19-26	1,000	—	
	Molo Paolo Boselli				} Coal. 7 travelling-bridge cranes with grab, 3 jib (with grab), portal.
	North-east end. . .	24	230	—	
2	North-west quay . .	26-31	1,020	5	
	West quay . .	21½-25½	760	5	
	<i>Darsena Vittorio Emanuele</i>				
	North-east quay . .	26-28	210	—	Coal and scrap iron.
	Calata Orientale . .	20-23	740	5	Coal and ore. 2 travelling bridge-cranes.
	South-east quay . .	..	250	—	Scrap iron.
	South quay . .	16½-19½	280	2	Scrap iron.
	West quay . .	23-26	710	2	Timber. Custom-house behind south end, railway station behind north end.
	North-west quay . .	22-27	525	2	General cargo for main warehouse.
	<i>Porto Vecchio</i>				
3	Calata del Carbonne				
	North end (head) . .	22	230	—	} Ships waiting to berth or discharging into lighters. NE. end backed by main general warehouse.
	North-west quay . .	18-25	690	4	
	Centre quay . .	7-12	270+75	—	
4	Western quay . .	20½	240	—	
	<i>Darsena Vecchia</i>				
	East quay . .	11½-14	425	—	Careening. Slipway at south end.
	South quay . .	5-10	300	—	Yachts and small craft. Boat camber at east end.
	West quay				
	Calata Pietro Sbarbaro	5-14	590	—	} Both quays are curved.
	Marinetta . .	..	280	—	
					Yachts and small craft.

The anchorage at *Vado Ligure* ($44^{\circ} 16' \text{ N.}$, $8^{\circ} 27' \text{ E.}$), which is mainly used by tankers discharging to the oil installations there (Appendix II), extends for some 3 miles north and north-east along the shore of the Rada di Vado, the bay between Cape Vado and Savona. A breakwater which extends about 800 feet north-east from the cape affords protection to a small quay immediately to its north. In the curve of the bay are an oil and coaling jetty and three other oiling piers, of which details are as follows:

<i>Name</i>	<i>Length (feet)</i>	<i>Depth of water at head (feet)</i>	<i>Position and uses</i>
AGIP oil and coaling jetty	1,320	30	$\frac{1}{2}$ mile NW. of quay. Coal unloaded from lighters by 2 elevators along inner section.
SIAP oiling pier	1,125	30	$\frac{1}{2}$ mile farther north, just south of mouth of T. Segno.
Nafta oiling pier	1,410	27	$\frac{3}{4}$ mile farther north, just south of mouth of T. Quigliano.
Petrolea, Multedo oiling pier	1,380	30	1 mile farther NE., at mouth of R. San Cristoforo, west end of Fornaci.

Facilities. The Captain of the Port's office at Savona is behind the coast-road viaduct on the north-west of Porto Vecchio, and the pilots' tower, the Torre di Leone Pancaldo, is near by. The Port Health Office is near the north-east end of the Molo Paolo Boselli, while the customs-house is behind the south end of the west quay of the Darsena Vittorio Emanuele.

The peace-time equipment included 5 tugs and more than 100 lighters, with many small craft and fishing-vessels.

There are fixed cantilever cranes at the Funivie jetty, and travelling bridge-cranes with grabs for handling coal and ore on the Molo Paolo Boselli and the east quay of the Darsena Vittorio Emanuele. A variety of cranes is available on the other quays of the latter and on the north-west quay of the Calata del Carbonne. The port was equipped with floating cranes and sheerlegs, but only one of each could be identified in March 1943.

The largest warehouse is that already mentioned on the Calata del Carbonne. It is three stories high and has a total storage area of 116,000 feet. There are two other modern warehouses, one behind the south quay of the Darsena Vecchia and the other behind the Marinetta. For the storage of oil there are tanks at the root of the

Molo L. Razzo, connected by pipe-line to the Molo Frangiflutti. Their total capacity is about 14,000 tons of oil (Appendix II). In addition to the 10,000 tons of coal that can be held in the Funivie silo, there are normally coal dumps on the Molo Paolo Boselli and on the east quay of the Darsena Vittorio Emanuele. The total coal storage capacity of the port is between 100,000 and 150,000 tons. The Molo Frangiflutti is the only quay not equipped with hydrants.

There is a small floating dock measuring 105 × 30 feet overall. The slipway in the Darsena Vecchia can only take small craft. Hulls, machinery, and boilers can be repaired, and presumably the Ilva and the Servettaz-Basevi steel works could undertake almost any repairs.

Apart from the facilities for handling coal, Savona is ill equipped for clearance either by rail or by road. Although every quay except the Molo Frangiflutti and those of the Darsena Vecchia is served by rail, all traffic must converge upon a single track which tunnels under the old fort before reaching the main line on the west of the town. The lines are not flush. Roads lead from all basins, but only in the Darsena Vecchia are the quays directly backed by roads; elsewhere railway tracks intervene between quayside and roadway.

Trade and Connexions. In 1939, 2,036 ships, totalling approximately 1,850,000 tons, entered and cleared the port. The 2,350,000 tons of goods discharged was nearly six times as great as the tonnage of goods loaded, which was a mere 421,000 tons.

Coal is by far the most important item of trade, accounting for more than 70 per cent. of the imports by weight, and for about 40 per cent. of the exports. The other main imports are iron and steel, food-stuffs, metallic minerals, mineral oil, and cellulose, each more than 50,000 tons. Of the exports, coal is followed by rice, artificial fertilizers, steel and other worked metal, metallic minerals, candied and preserved fruits, oil cake, and chestnuts; only coal and rice exceed 50,000 tons.

Passenger traffic is not large, but several local lines from Genoa call at Savona as does the weekly Fiume-Naples-Genoa-Valencia service. There is thus a weekly connexion westwards to Marseilles and its services, and frequent connexion is assured with the many sailings from Genoa.

Inland Communications

Railways. Savona is on the main line, single-track electrified from Ventimiglia to Genoa. From Savona there is a single-track electrified line to Turin via Fossano, from which single-track electrified lines

diverge at S. Giuseppe di Cairo for Acqui and Alessandria, and at Ceva for Turin via Bra. An electric tramway goes to Vado.

Roads: Savona lies between Imperia and Genoa on road 1 from Ventimiglia to Rome. Road 29 crosses the Cadibona pass to Turin, whilst road 28 branches from it at S. Giuseppe di Cairo for Turin via Fossano and road 30 for Alessandria diverges at Piana Crixia. From Albisola another main road leads inland to Acqui, also on road 30.

GENOA (Génova). Latitude $44^{\circ} 24' N.$, $8^{\circ} 54' E.$ Population 512,313.

Provincial capital. Seat of archbishopric. University. Chambers of Commerce. British Chamber of Commerce for Italy. British Consul-General and Vice-Consul.

Position and Site (Fig. 12)

Genoa is situated at the head of the gulf of Genoa, where the Ligurian mountains are at their narrowest and communication with the Northern Plain is comparatively short and easy by the Giovi pass. The city also owes much of its importance to its bay, which in an otherwise more or less unbroken coast provides the best and only natural harbour. Steep ridges of hills, however, rise immediately inland at right angles to the coast, and have limited intensive urban development to their more gentle lower slopes and to the narrow and almost level coastal strip. The main nucleus of the city, which coincides roughly with the medieval and Renaissance settlement, is in an amphitheatre of low undulating hills on the north-eastern and eastern sides of the semicircular natural harbour. This part of the city, which until about the seventeenth century was limited on the east by the torrent Bisagno, is closely built and many of its streets are tortuous and narrow. The modern city has spread beyond the original nucleus west and east along the seaboard and northwards up the valleys of the T. Polcevera and the T. Bisagno.

A steep mountain ridge, which encircles the main part of the city on the north and north-west, reaches heights of over 1,200 feet and separates the natural harbour from the western suburb of Sampierdarena. The suburbs east of the T. Bisagno are continuous with the main part of the city, though they have regular and well-planned streets. To-day Genoa's western suburbs from east to west include Sampierdarena, Cornigliano, Sestri Ponente, Pegli, Pra, and Voltri, all of which are strung closely together along the narrow coastal plain where the steep north-south hill ridges permit settlement. These suburbs are, for the most part, industrial and are mainly connected

with shipbuilding and armament manufacture. Along the eastern seaboard are the wealthy residential suburbs of Sturla and Quinto al Mare, and the residential and sea-side resort of Nervi. These all spread farther inland than their western equivalents as the hills slope somewhat more gently inland. The principal northern suburbs are in the Polcevera valley, which is followed by the main routeways to the Northern Plain. An almost continuous string of industrial suburbs, including Rivarolo, Bolzaneto, and Pontedecimo, line the moderately level valley floor and the lower and more gentle hill-slopes, whilst on the hill-sides above are scattered villas. The valley of the T. Bisagno is less densely populated, though it contains some less important factories and working-class suburbs.

History

The name Genoa is probably derived from the Greek word *zenos* or stranger, and the early civilization of the city is due to the contact of the primitive Ligurian inhabitants with Greek and Phoenician traders. Tombs of the fifth and sixth centuries B.C. discovered in Genoa show that, at a time when Rome was still an agricultural community, the Genoese were engaged in commerce and possessed some degree of culture. When Hannibal invaded Italy Genoa sided with Rome and was besieged and sacked by the Carthaginians (205 B.C.). The Romans rebuilt the city, enlarged the port, and recognized the Genoese as their faithful allies and 'defenders of the sea'. During the early barbarian invasions Genoa remained an outpost of the Eastern Empire until, in A.D. 641, it fell to the Lombards and became the capital of the duchy of Liguria. When, under the Franks, Liguria was resettled on a feudal basis, Genoa, with the aid of its bishop, emancipated itself from the control of the neighbouring marquises, and became a bulwark of resistance to the Saracens. In 936 these pirates took and sacked the city, but the Genoese were able to retaliate and, in the course of their reprisals, gained a footing in Sardinia and Corsica. This was the beginning of Genoese sea power which reached its height during the Crusades. It was from Genoa that Godfrey de Bouillon and his companions embarked on the First Crusade (1097), and within the next thirteen years Genoa fitted out no less than eight expeditions to Palestine. Under her leader, Guglielmo Embriaco, she won victories which brought her valuable commercial bases in the East, and established her reputation as the first maritime city in Europe. In the thirteenth century Genoese exports reached their highest figure, and a sign of prosperity in the city was the replacement

of wooden by stone houses. Then, if not earlier, the harbour was improved by the construction of a breakwater extending nearly half-way across the bay, now incorporated in the Molo Vecchio. The battle of Meloria (1284) marked the final defeat of Pisa, while that of Curzola (1298) was the first of a series of victories over Genoa's only other rival, Venice.

With increase of wealth went growth of internecine strife among the old noble families. Not only did Guelf Fieschi and Grimaldi wage war with Ghibelline Doria and Spinola for control of the city, but families of the same party quarrelled among themselves. It was to make peace between Doria and Spinola that the Emperor Henry VII was invited to Genoa and given sovereignty over it in 1311. In a vain attempt to establish order a Doge was set up in 1340. The nobles were excluded from the new office, which was first held by Simone Boccanegra and afterwards became the virtual monopoly of two plebeian families—Adorni and Fregosi. Geonese wealth, however, remained in private rather than in public hands. The nobles held lands along the Riviera and colonies overseas, while in 1407 the famous Bank of St. George assumed control over Corsica. The dogeship did not rest upon the people but was dependent upon one or other faction of the nobility or upon foreign Powers. In 1396 Charles VI of France was given suzerainty over Genoa, and from then until 1528 periods of liberty alternated with periods of subjection either to France or Milan. Meanwhile Genoa's maritime supremacy was wrested from her by Venice, and the fall of the Eastern Empire (1453), with which Genoa had been closely associated, dealt a severe blow to her commerce. The end of attempts at popular government came in 1507 when Genoa was under a French protectorate, and a rebellion, directed chiefly against the Francophil nobility, was ruthlessly crushed by Louis XII, the Doge Paolo da Novi being beheaded. In 1528 Andrea Doria quarrelled with France and seized Genoa in the name of the emperor, setting up a government in which membership of the ruling council was confined to certain noble families. He remained supreme until his death in 1560, at the age of ninety-three. Doria saved his city from anarchy and gave it the internal stability which enabled it to remain independent for the next two centuries, in spite of declining prosperity and the ambitions of foreign powers.

Friendly relations with Spain gave Genoa new trading opportunities, but it also exposed her to attack from France. French agents fomented civic faction and encouraged Corsican efforts after independence until, in 1768, Genoa sold Corsica to France. Louis XIV attacked

Genoese shipping at sea and in 1684 bombarded the harbour. In 1746 the Austrians occupied Genoa, but they were driven out by a popular rising begun by a lad called Balilla, whose name was adopted by Mussolini for the junior organization of Fascist youth. During the revolutionary period Genoa was first made the Ligurian Republic and then became a part of the French Empire. At the Congress of Vienna (1815) it passed to the House of Savoy, which had long coveted possession of it. The loss of their republican independence was a bitter blow to the Genoese, but King Charles Felix spent much time in Genoa and helped to reconcile it to Piedmont, while Charles Albert continued his policy, beginning the railway from Turin to Genoa. Cavour moved the naval base to Spezia and developed Genoa as a commercial centre. The harbour had been improved by the building of the Molo Nuovo in 1643, and from 1877 onwards there was an almost continuous programme of harbour works in progress, culminating in the formation of the new docks, known as the Bacino XXVIII Ottobre, under the Fascist regime.

Foremost among the distinguished citizens of Genoa are Christopher Columbus (1451-1506) and Giuseppe Mazzini (1805-1872). They are representative of the two chief characteristics of Genoa, as seen throughout her history, maritime prowess and love of liberty.

Public Buildings and Monuments

Genoa is pre-eminently a city of palaces: These range from the medieval homes of Genoese families in the old quarter of the town, such as the Casa degli Embriaci and the Casa di Lamba Doria, presented to him in honour of his victory over Venice in 1298, to the magnificent sixteenth- and seventeenth-century mansions which line the Via Garibaldi. Of special historic interest is the Palazzo di S. Giorgio, built near the harbour in 1260 as the residence of the Capitani del Popolo, and later the headquarters of the Bank of St. George. The Palazzo Rosso, in the Via Garibaldi, presented to the city by the Duchessa di Galliera in 1874, is an admirable example of a seventeenth-century palace, decorated with frescoes by De Ferrari and other Genoese artists of the period, and containing an important collection of pictures. Almost opposite it is the equally splendid Palazzo Bianco, dating from the sixteenth century, and containing artistic, scientific, and historical collections. The Palazzo Doria Pamphili, standing in its own garden near the Stazione Piazza Principe, was built by Andrea Doria (1521-1529), and here he entertained the Emperor Charles V. S. Lorenzo has been the cathedral church of Genoa since 985, when

the episcopal see was moved from S. Siro, then outside the walls, through fear of outrage from the Saracens. The present building was consecrated in 1118; its façade, adorned with bands of black and white marble and approached by a flight of steps guarded by lions, presents an impressive appearance. In the Cappella di S. Giovanni Battista, a richly decorated Renaissance structure, are preserved the bones of St. John Baptist brought from Palestine during the First Crusade. Among medieval churches that of S. Matteo is the ancient church of the Doria family, built in 1125. On the façade are inscriptions recounting the glorious deeds of the Dorias, and within is the sword presented to Andrea by Pope Paul III. The Santissima Annunziata is a fine example of baroque architecture with paintings representative of the best Genoese art of the seventeenth century. Since 1812 the university has occupied a handsome seventeenth-century palace by the Genoese architect Bianco. Two great thoroughfares give a general impression of the character of the city. The Circonvallazione a Mare commands fine views over the sea and the extensive harbour, whilst the Circonvallazione a Monte winds along the hills above the city and presents a wonderful panorama of its buildings.

Industry

Genoa has very important metallurgical and engineering industries which are mainly connected with shipbuilding. These heavy industries are chiefly located along the western seaboard and in the Polcevera valley. The well-known firms of Ansaldo and Ilva both have large works in Genoa, the former predominating in the engineering industry and the latter in the metallurgical and coking industries. The Ilva steel works at Sestri Ponente have an annual capacity of 600,000 tons of steel, whilst the Societa Italiana Acciaierie Cornigliano owned by Ansaldo, Cogne, and Dalmino have an annual capacity of 400,000 tons of pig-iron and 500,000 tons of steel. The Ansaldo foundry at Cornigliano is for non-ferrous metals. Ilva has a coke-oven plant at Bolzaneto, associated with their steel works, whilst Ansaldo has two smaller coke-oven plants at Cornigliano. The Ansaldo Cantieri Navali (Sestri Ponente) is Italy's largest shipyard and has 15 building slips. The 35,000-ton battleship *Littorio* and the transatlantic liner *Rex* were built here. The yard normally employs about 4,000-4,500 workers. The other shipbuilding yards are small, though the fitting-out shops and repair slips are important. Branches of Ansaldo also manufacture locomotives, steam boilers for ships and factories, steam turbines, industrial, marine, and diesel engines, cranes,

girders, electric motors, heavy electrical equipment, artillery, and various other armaments. The Nasturzio tin-plate works, which makes containers for the canning industry, is one of the largest of its kind in Italy. Other lesser firms manufacture radio equipment, precision instruments, rolling-stock, electrical machinery, tubes, and aircraft.

The refining and processing of vegetable and seed oils, which are mainly imported, is a considerable industry. The S.A. Gaslini have vegetable oil and seed-oil refineries at Rivarolo and Bolzaneto, whilst the Olefici Liguri Lombardi have one at Sampierdarena. The soap industry is also notable, and Mira Lanza and Saponiera Lo Faro, the largest manufacturers of their kind in Italy, both have factories in the city.

The food industry is important; the most outstanding establishments are the flour mills (III, p. 340), pasta factories (one large), big sugar refineries, and notable canning factories, mainly for anchovies and vegetables, belonging to Cirio and Arrigoni (III, p. 338). Beer, liqueurs, mineral waters, crystallized fruit, and confectionery are also made. Textile mills are numerous, the most notable being in the western suburbs. The Linificio e Canapificio Nazionale have manilla and sisal hemp spinning mills at Sampierdarena; and Cucirini Cantoni Coates (a subsidiary of J. & P. Coates of Paisley) a cotton spinning mill at Pegli, whilst there are cotton and jute mills at Pra and Voltri respectively. Cotton manufactures, especially hosiery, are also carried on in the city. The tanning and leather industries are important, gloves being a notable product. Finally there are paint factories, printing works, and a State tobacco factory, whilst sawmills, cement works, and quarries are numerous in the outskirts of the city.

Description of Port

The port is easy of access and able to accommodate the largest vessels afloat. Its approaches are free from obstructions, and entrance is at either end of a long detached breakwater, built roughly parallel to the shore as a protection for the whole harbour. Four main basins can be distinguished, the Avamporto (1) and Porto Nuovo (2), Porto Vecchio (3; the original nucleus), the Bacino Vittorio Emanuele III, and the Bacino XXVIII Ottobre (4). Their total water area is over 1,000 acres, and they are lined with 10 miles of quays which can handle up to 150 ships at one time.

The outer breakwater is nearly 3 miles in length. Its eastern section, the Molo Duca di Galliera, is 4,021 feet long and stretches in a straight

line roughly north-west and south-east. The western portion, the Molo Principe Umberto, extends 11,300 feet from east-south-east to west-north-west. Both are exposed to very heavy seas, but have a shelter wall and a quay on the inner side. There are no facilities on either, and water can only be supplied by boat. Warships and ships waiting to berth or to sail moor stern-to inside the Molo Duca di Galliera. From this long breakwater 6 spurs project landwards, 3 at the west end of the Molo Principe Umberto, 2 at the east end of the Molo Duca di Galliera, and 1 at their junction. This last once joined the Molo Duca di Galliera northwards to the Molo Nuovo before a breach was made to connect the Avamporto with the Bacino Vittorio Emanuele III.

The south-eastern entrance to the port, the Bocca di Levante, is between the Molo Duca di Galliera and the Molo Umberto Cagni, a dog-legged breakwater affording protection from the south-east. This entrance, which is 825 feet wide with depths of 65 feet in mid-channel, gives access through the Avamporto to Porto Nuovo and Porto Vecchio and also to the new western works. The western entrance between the rather complex head of the Molo Costanzo Ciano and the spurs at the west end of the Molo Principe Umberto is 330 feet wide and has a depth of 48 feet in mid-channel. It is used mostly by ships clearing from the Bacino XXVIII Ottobre.

The Avamporto and Porto Nuovo are separated from each other on the east by the Molo Giano, between which and the inner leg of the Molo Umberto Cagni is a small basin, the Porticciolo Duca degli Abruzzi. This is protected on its western, open side by a floating barrage designed to keep out oil and other refuse. The entrance, which can be closed, is 69 feet wide and 36 feet deep. On the north side of the Molo Giano within Porto Nuovo are the principal fitting-out basins and graving docks. Three quays, the Calate della Grazie, Boccardo, and Gadda, complete the east side of Porto Nuovo. On its west, between the entrance to the Bacino Vittorio Emanuele III and that to Porto Vecchio are the main oil-storage installations, situated on the Calata Olii Minerali and the Ponte Paleocapa, which form the east end of the Molo Nuovo.

The entrance to Porto Vecchio, between the Ponte Paleocapa and the Molo Vecchio, is 1,000 feet wide with a depth of 40 feet in mid-channel. This inner harbour, still the principal commercial section of the port, is a semicircular basin lined with quays from which 10 radial jetties extend towards the centre. The four of these on the east are small, while the six on the north and west are larger and more modern.

Broadly speaking, the east, which is the original harbour, is now used by small vessels and for discharging from lighters, while the chief commercial and exporting quays with modern warehouses and loading facilities are to the west. Passengers and mail are dealt with almost exclusively by the Ponte Andrea Doria and the Ponte dei Mille (Stazione Marittima) on the north.

The entrance to the Bacino Vittorio Emanuele III from the Avamporto is about 300 feet wide with a depth of 37 feet. The quays and jetties in the eastern half of this basin are equipped with travelling bridge-cranes with grabs, and almost all the coal that is imported is handled here. Land has been reclaimed west of the coal quays for a seaplane station, the Idroscalo, but at some future date this area is to be developed as a commercial quay and the seaplane station removed to a more extensive site. North-west of the Idroscalo is the Porticciolo di Servizio, a small harbour, roughly 660×570 feet, used by lighters and block-setting craft.

The Bacino XXVIII Ottobre lies west of the Bacino Vittorio Emanuele III and is the most recent part of the port. Land was reclaimed south of the Via della Lanterna and an airfield constructed. South of it are five jetties connected by quays and built not at right angles but at an angle of some 70° with the new shore line. None is fully developed. The Ponte Etiopia (5) and the Ponte Eritrea (6) are only partially equipped, the Ponte Somalia (7) has no facilities, and not even the exterior walls of the Ponte Libia are finished. The Ponte di Ponente is more nearly complete and shares in the ship-repairing of the westernmost basin. This basin is enclosed on the west by the Molo Costanzo Ciano, which extends from the east bank of the T. Polcevera and is the westernmost breakwater of the present port.

A future extension is planned west of the T. Polcevera, and in connexion with the development of the S.I.A.C. rolling mills at Cornigliano a breakwater about 2,700 feet long is already built parallel to and some 120 feet from the shore. The Y-shaped mole farther west below the Castello Raggio is the eastern breakwater of Sestri Ponente.

Quays in the old eastern part of Porto Vecchio are generally $7\frac{1}{2}$ feet above sea-level, while those in the north and west of that basin are about $9\frac{1}{2}$ feet high. The main quays in the rest of the harbour are 10 feet above sea-level.

Facilities. The head Port Offices are in the north-east corner of the maritime station on the Ponte dei Mille, and there are subsidiary offices on the Ponte Morosini (for granting pratique), on the Calata

Passo Nuovo, and in the customs-house. This last is behind the grain-silos on the Calata S. Limbania, and the Port Authority is in the Palazzo S. Giorgio, east of the root of the Ponte Embriaco.

The normal peace-time complement of tugs was about a score. The number of lighters and other small harbour craft averages anything up to 2,000 vessels.

The original hydraulic cranes, 70-80 in number, are confined to the north and east of Porto Vecchio, and to the Calate Gadda and Boccardo in Porto Nuovo. Electric cranes are now installed among these hydraulic cranes, and exclusively on the other quays. Most cranes, whether hydraulic or electric, are jib portal or semi-portal of $1\frac{1}{2}$ tons capacity, but 4 on the graving-docks and 3 of the four floating cranes are heavier. The other floating equipment in 1943 included 1 small crane, 4 sheerlegs, and 2 special 452-ton block-lifting structures, while there are two drophead jib cranes in the coal hulk usually moored alongside the Calata alla Sanità. The Port Authority maintains a repair shop on the Calata P. Giaccone.

The total storage space is in the neighbourhood of $2\frac{1}{2}$ million square feet. The older buildings are usually single-story, iron-frame sheds with corrugated iron sides and sliding doors. The more modern warehouses are of reinforced concrete, usually with 2 or 3 stories. In the new basins general warehouses are at present only to be found on the Ponte Eritrea and the Ponte Etiopia, and in Porto Nuovo only on the Calata Gadda, but in Porto Vecchio they are on all quays and jetties except the Ponte dei Mille, and the Calate S. Limbania, Rotondda, and Porto Franco. There are cold stores in the Darsena Municipale and on the Calata Gadda, while the Calata S. Limbania is completely covered by grain-silos with a total capacity of about $2\frac{1}{2}$ million bushels. The warehouses of the Porto Franco for the storage of goods free of customs or for the entrepôt trade are in the south-east corner of Porto Vecchio.

Oil is stored on the quays at the head of the Molo Nuovo. The total capacity of the tanks is some 80,000 tons. There is also a large underground store at the root of the Molo Costanzo Ciano (Appendix II). Coal is handled exclusively on the Calata alla Sanità and in the east of the Bacino Vittorio Emanuele III, where the transporter cranes are said to be capable of discharging 3,000 tons per vessel per day. The storage area is between 40,000 and 50,000 square yards with a capacity of 100,000 tons. The coal hulk alongside the Calata alla Sanità has a capacity of 15,000 tons. Hydrants are on all quays and jetties except the Calate Passo Nuovo, Salumi, Porto Franco,

Cattaneo, and al Molo Vecchio, and the Mandraccio in Porto Vecchio; the Calata delle Grazie, the graving-docks and the Molo Umberto Cagni in Porto Nuovo and the Avamporto; the Idroscalo and the Porticciolo di Servizio in the Bacino Vittorio Emanuele III; and the quays west of and including the Ponte Somalia in the Bacino XXVIII Ottobre. All quays and jetties except those of the Porticciolo Duca degli Abruzzi and the outer defences are electrically lit.

The Municipal graving-dock in Porto Vecchio is the oldest in Italy, having been completed in 1851. Between 1889 and 1928 an area was reclaimed inside the root of the Molo Giano, and three docks (Nos. 1, 2, and 3) were completed, with the Molo Guardiano to protect them and house extra fitting-out shops. No. 2 dock was later lengthened to its present dimensions, but the accommodation became insufficient, and so No. 4 dock was built in the sea west of the Molo Guardiano. It was completed in its present form during July 1939, but provision was made to remove the floating caisson which at present links it to the Molo Giano, to cut that mole, and to extend the dock to more than 1,100 feet with entrance at either end. All the docks and quays are adequately equipped, and the area is almost completely self-contained.

Details of Graving Docks

	<i>Extreme length ft. in.</i>	<i>Coping width ft. in.</i>	<i>Width at entrance ft. in.</i>	<i>Depth on sill ft. in.</i>
<i>Porto Vecchio</i>				
Municipal graving-dock . . .	280 5	72 2	..	20 0
<i>Porto Nuovo</i> (docks given in order from east to west)				
No. 2 graving-dock . . .	702 1	60 7	59 1	26 0
No. 3 graving-dock . . .	853 0	105 0	..	36 0
No. 1 graving-dock . . .	571 0	82 8	81 4	28 6
No. 4 graving-dock . . .	919 0	135 9	..	42 7

Slipways number 5. In addition to the three in the Idroscalo, there is one outside the harbour at the root of the Molo Umberto Cagni, and another in Porto Vecchio at the south end of the Calata Chiappella.

The repair and fitting-out shops are grouped into five as follows: the Officina Allestimento Navi shops on the Moli Giano and Guardiano; the Cantieri del Tirreno shops on the Calata della Grazie; the Odero-Terni-Orlando shops behind the Calata Gadda; the Port Authority's repair shops for cranes on the Calata P. Giaccone; and the Ansaldo shops at the west end of the Bacino XXVIII Ottobre. In addition the town has large metallurgical industries (p. 228).

The Idroscalo (sea-plane station) has 2 slipways, 2 basins, 1 with a slipway at its head, 2 small dry docks, and a wide apron behind them.

All the masonry used in the construction of the port has been quarried from the S. Benigno promontory which ends in the Punta della Lanterna. Below it on the west there is adequate equipment in the Porticciolo di Servizio to deal with any replacements or new construction that may be needed.

The hilly nature of the site of Genoa and such features as the S. Benigno spur necessitate much tunnelling, but both rail and road facilities are adequate.

All quays and jetties are served by rail except the graving-docks and the three south-eastern moles of Porto Nuovo and the Avamporto, the grain pier in Porto Vecchio, the Porticciolo di Servizio and the Idroscalo in the Bacino Vittorio Emanuele III, and the Ponte Somalia and the Ponte Libia in the Bacino XXVIII Ottobre. Lines are flush only between the Calata Chiappella and the Mandraccio in Porto Vecchio, and in the Bacino XXVIII Ottobre, but level crossings are frequent. All parts of the harbour served by rail are interconnected and linked to the four main marshalling yards of the State Railways: eastwards from the eastern quays of Porto Vecchio by the Grazie tunnels to the Terralba yards; to the S. Limbania yards behind the Ponte Andrea Doria; and westwards by tunnels from the western quays of Porto Vecchio and from the Molo Nuovo, and from the new western basins to the Sampierdarena and Campasso yards.

Roads reach all quays and jetties except the grain pier, the Calata Marinetta and the west of the Mandraccio, but they are often obstructed by level crossings and warehouses. A main east-to-west artery skirts the harbour and is joined at frequent intervals by the port roads.

Trade and Connexions. There is close rivalry with Marseilles as the chief port of the northern shore of the Mediterranean, first one and then the other being pre-eminent. The number of ships using the port has varied widely in recent years, but the 1938 and 1939 figures approximate to the average:

		1938	1939
Ships entered:	number . . .	5,404	5,259
	tonnage . . .	11,230,000	10,379,000
Ships cleared:	number . . .	5,364	5,271
	tonnage . . .	11,169,000	10,424,000
Goods landed:	tons . . .	5,642,000	6,524,000
Goods loaded:	tons . . .	1,229,000	1,266,000

Of the imports coal and coke are easily the chief, accounting for nearly 50 per cent. of the tonnage. The next most important groups,

each totalling over 100,000 tons, are, in order, mineral oils, iron and steel, salt, chemicals and artificial fertilizers, cereals, animal and vegetable oils and fats, other metals, textile materials, and foodstuffs. In the exports the following bulk largest: machinery and metal goods; chalk, cement, and gypsum; textiles; rice and flour. These groups are followed by steel and other metals, animal and vegetable oils and fats, chemicals and fertilizers, wine, and sugar.

Passenger traffic is considerable, and Genoa ranks fifth among Italian passenger ports. The numbers disembarking and embarking were respectively 84,419 and 101,675 in 1938, and 66,920 and 96,805 in 1939. In addition to several occasional services there are the following regular freight and passenger sailings: weekly to Savona, Imperia, La Spezia, Leghorn, and Naples; Marseilles, Barcelona, and Valencia; Sardinia and Sicily; Brindisi, Venice, Trieste, and Fiume; Tunis, Tripoli, Benghazi, and Cyrenaica; Alexandria and Port Said; Piraeus and Istanbul; Bulgaria and the Danube ports: fortnightly to Rhodes; Smyrna; Salonika; Palestine and the Levant; Suez, the Red Sea ports, and Somaliland; Bombay and Singapore; Gibraltar, Lisbon, and Oporto; Palma, Ceuta, Casablanca, and Seville; London and Holland: every three weeks to Canada: monthly to Dakar, Accra, Lagos, and Matadi; Capetown, Durban, Beira, and Dar-es-Salaam; India, Colombo, Madras, Saigon, Manila, Hong Kong, and Shanghai; Algiers and New York; Havanna and the Gulf ports; Panama and Chile; Trinidad, Los Angeles, and Vancouver: and six times a year to Australia. This list does not include the intermediate ports, and in many cases the services are in fact more frequent than stated owing to overlapping.

Since the beach at *Sestri Ponente* ($44^{\circ} 25' \text{ N.}$, $8^{\circ} 50' \text{ E.}$) is quite open, four breakwaters have been built to give protection to the shipbuilding yards. That on the east is Y-shaped and projects some 600 yards south-westwards from Castello Raggio, while that on the west is built in two legs, 570 yards and 543 yards long, south and south-east. Some 500 yards south of its head is the western end of a detached breakwater which runs parallel to the shore for about 570 yards. The fourth breakwater lies off the Ansaldo yards, its western end 70 yards to seaward of the Ansaldo pier. It is built south, south-east, east, and north-east in four unequal legs, with a total length of 700 yards.

Along the shore only one of the two original piers remains, that already referred to, at the west end of the Ansaldo yards. It is 425 feet long with a depth of 16 feet at its head. On it are 4 sets of rails and 3 cranes.

No.	Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
1	<i>Avamporto</i>				
	Molo Umberto Cagni				
	Outer arm . . .	29-39	1,190	—	Ships laid up.
	Inner arm ¹ . . .	20	750	—	Slipway at root on outer side.
	Porticciolo Duca d.				
	Abruzzi . . .	..	..	..	Yachts and pleasure craft.
	East quay . . .	16	500	1	..
	North quay . . .	8½-16	790	—	Boathouses line this quay.
	West moles:				The quay face is in four steps.
	Northern . . .	29	400	—	..
	Southern . . .	33	150	—	..
	Molo Giano . . .	..	..	..	Fitting-out shops. Pilots' look-out tower at head.
	South side . . .	? 10-13	1,000	—	Warships, submarines, and ships in quarantine.
2	<i>Porto Nuovo</i>				
	Molo Giano				
	North side . . .	? 10-17	900	—	Small craft and ships laid up.
	Molo Guardiano . . .	..	..	..	Ships refitting.
	West quay . . .	22½-30	1,270	—	..
	East quay . . .	18	660	—	..
	Calata Grazie . . .	26	650	2	Ships refitting.
	Calata Boccardo . . .	23	1,220	7	Timber. Large stacking space.
	Calata Gadda . . .	23-28	1,000	2 and 1 elevator	Frozen meat. Large refrigerating plant. Ships refitting.
	Calata Olii Minerali . . .	? 27-34	1,300	4	Fuel and lubricating oils. Cranes are jib-hoists for pipe-lines.
5	Ponte Paleocapa . . .	..	..	..	Lubricating oils.
	East side . . .	26-29½	420	—	..
	North-east end . . .	26-29½	150	—	..
3	<i>Porto Vecchio</i>				
5	Ponte Paleocapa				
	West side . . .	26	223	—	Lubricating oils.
	Molo Nuovo				
	Calata alla Sanità . . .	12-26	2,460	5	Coal at western end.
	Calata Passo Nuovo . . .	23-29	310	3	Lubricating oil in drums. Sub-office of Captain of Port.
6	Ponte Caracciolo				
	South quay . . .	18-24	1,080	9	..
	East end (head) . . .	26	400	1	..
	North quay . . .	20-25	1,210	10	..
	Calata S. Benigno . . .	15-20	360	3	..
	Ponte Biagio Assereto				
	South quay . . .	20-24	1,310	9	..
	East end (head) . . .	6½-22	410	—	..
	North quay . . .	25-30	1,310	14	Wool and jute.
	Calata Chiappella				
	South-west end . . .	17	210	1	Small boat camber at south end.
	South-east quay . . .	24-30	475	4	Wool, jute, and cattl

¹ South side of Porticciolo Duca degli Abruzzi.

No.	Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
	Ponte Cristoforo Colombo				
	South-west quay .	16½-30½	625	5	..
	South-east end (head)	22½	340	1	..
	North-east quay .	23-30½	650	3	..
	Calata S. Lazzaro .	17-27½	750	5	..
	Ponte Andrea Doria				
	West quay .	23-31	650+150	4	..
	South end (head) .	35	245	—	..
	East quay .	36	770	—	Passengers and mail.
	Calata Zingari .	? 26-31	640	1	Passengers and mail.
	Ponte dei Mille .	..	..	..	Meteorological station at south end.
	West quay:				
	North part .	27½-29	360	—	Passengers and mail. Stazione Marittima (3 stories) in centre. On first story open terrace 21 ft. above quay level used for direct access to ships' decks. West quay normally for disembarking and east quay for embarking. Head Offices of Captain of Port on top floor of maritime station.
	South part .	32-33	360	—	
	South end (head) .	21	133	—	
	East quay:				
	South part .	29-32½	490	—	
	North part .	23-29½	292	1	
	Calata S. Limbania .	20-29	307+307	—	Grain. Lighters only. Grain silos.
	Grain pier .	26-31	330	6	Unloading by 6 grain aspirators direct to the silos. Customs-house behind grain silos.
	Ponte Adolfo Parodi				
	North-west quay .	27-29	650	6	Cereals, vegetables, and seeds.
	South-west end (head)	26-27½	325	1	Bananas on SE. quay.
	South-east quay .	24	650	1	
	Calata Darsena .	21-24	430	4	Wine. Large storage vat at SE. end.
	Darsena Municipale				
	South-west quay .	23	380	3	Dried and salted fish, canned goods and general cargoes not required to pass through a bonded warehouse, SE. of basin formed by NW. side of municipal graving-dock.
	North-west quay .	22	260	2	Cold store.
	North-east quay .	19½	630	3	Wine. NW. side is SE. side of municipal graving-dock.
	Ponte F. Morosini .	..	..	..	On W. corner subsidiary office of Captain of the Port, for pratique. The Captain of the Port's tugs moor stern-to at SW. end.
	South-west end .	20½	105+130	—	
	South-east quay .	16-23	220	3	
	Calata Salumi .	19	300	3	..
	Ponte Calvi				
	North-west quay .	20½-22	290	1	..
	South-west end (head)	20½	105	—	..
	South-east quay .	22	290	2	..
	Calata Rotonda .	..	290	1	..

No.	Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
	<i>Porto Vecchio (contd.)</i>				
	Ponte Spinola				
	North quay . .	24½	490	4	..
	West end (head) .	19-24	165	—	..
	South quay . .	18-23	490	4	..
	Calata Porto Franco .	6½-16	290	2	..
	Ponte Embriaco				
	North quay . .	6½-17	295	2	} Cotton and skins.
	West end (head) .	17	105	—	
	South quay . .	18-26	290	1	
	Calata Cattaneo .	11-18	210	3	One crane is a bridge elevator serving the Deposito Franco.
	Calata Marinetta .	24-28	420	4	
	Calata al Molo Vecchio	29-30	1,440	13	Spices, vegetable oils, and frozen meat.
	Molo Vecchio (head).	23-26½	210+130 +350	—	Wool and cotton. Special cargoes for Magazzini Gene- rali behind quay.
	<i>Bacino Vittorio Emanuele III</i>				
	Calata Canzio . .	35-42	1,080	6	Coal.
	Calata G. Bettolo .	29-39	1,380	9	Coal.
	Ponte R. Rubattino				
	East quay . .	35-42	1,040	8	} Coal.
	South end (head) .	42	420	—	
	West quay . .	35	1,120	6	
	Calata P. Giaccone .	20-30	480	4	Repair shops for port gear behind quay.
	Ponte S. Giorgio				
	East quay . .	30-36	1,240	6	Phosphates and coal.
	South end (head) .	38	440	—	..
	West quay . .	25½-33	870	2	Coal for Concenter power- station at root.
7	Ponte Etiopia				
	East quay . .	20-34	900	—	..
	<i>Bacino XXVIII Ottobre</i>				
	Ponte Etiopia				
	South end (head) .	35	425	—	..
	West quay . .	35-39	1,310	10	..
	Calata Massaua .	33-35	525	—	Still undeveloped.
8	Ponte Eritrea				
	East quay . .	35-39	1,310	10	..
	South end (head) .	35-35	415	—	..
	West quay . .	33-35	1,310	8	..
	Calata Mogadiscio .	33	525	—	Still undeveloped.
9	Ponte Somalia				
	East quay . .	33-37	1,310	—	Still undeveloped. Centre of mole in use as a runway for airfield in rear of quays.
	South end (head) .	33-38	500	—	Still undeveloped.
	West quay . .	35-37	1,310	—	Still undeveloped.
	Calata Tripoli . .	35-37	525	—	Still undeveloped.
10	Ponte Libia . .	35-42	As Ponte Somalia	—	Not yet filled in. Dimensions of unnamed quay to west of it, as Calata Mogadiscio.
11	Ponte di Ponente				
	East quay . .	..	870+440	—	South end of east quay and head used as a block-yard.
	South end (head) .	..	500	2	Fitting out.
	West quay . .	..	1,310	2	

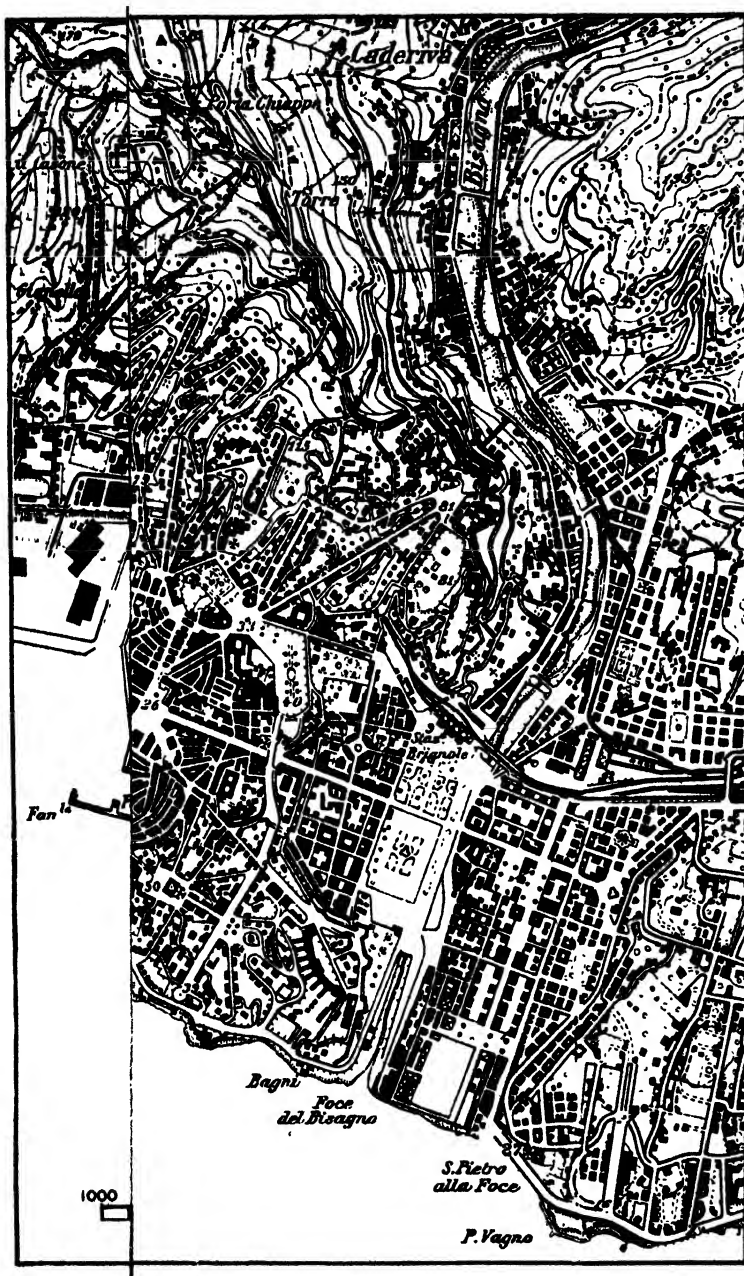


FIG. 12. Genoa

No.	Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
	'Ansaldo' quay . .	..	700	1	Fitting out. Boat camber at west end.
	Molo Costanzo Ciano	..	Quay 75 + 775 Break- water 340 + 290*	5	Fitting out. From juncture of two legs of western break-water; * an inner extension has been built 275 ft. SSE. and then about 200 ft. SSW. From the bend in this extension another projects ESE. parallel to the Molo Principe Umberto for 760 ft., leaving an entrance to the fitting-out basin about 165 ft. wide.

Inland Communications

Railways. Genoa is on the main line, double-track and electrified, from Turin to Rome. This line is duplicated across the Giovi pass by the double-track electrified line from Voghera and Milan. The following lines also converge on the principal station (Piazza Principe): (1) from Ventimiglia, single track (mostly) and electrified, and (2) from Asti and Ovada (junction for Alessandria), single track electrified. There is also a metre-gauge electric railway to Casella. The principal sub-stations in Genoa are Sampierdarena to the west of the main station and Brignole to the east.

Tramways. Electric trams serve the city and suburbs comprised in Greater Genoa, running to Voltri on the west and Nervi on the east. Trams also run to Prato and Ponte Decimo. Serro, on the latter line, is the starting-point of the mountain railway to the Santuario dell' Guardia. There are funicular railways from Piazza Principe to Granarolo, from Piazza Portello to Corso Magenta, and from Piazza Zecca (Corridoni) to Castellaccio Righi.

Roads. Genoa lies between Savona and La Spezia on road 1 to Rome. Road 35 crosses the Giovi pass to Tortona and Milan, and road 35-bis diverges from it at Serravalle Scrivia for Alessandria, as far as which it is duplicated by an autostrada. Road 45 leads to Piacenza, whilst another main road branches from road 1 at Voltri for Ovada.

Airways. There is a seaplane station in the Bacino XXVIII Ottobre, from which services operated to Alghero, Cagliari, and Tunis, and to Marseilles and Barcelona, being a continuation of the route from Rome. It was also a calling place on the service from Paris, Marseilles, and the French Riviera to Rome.

LA SPÉZIA. Latitude $44^{\circ} 6' N.$ Longitude $9^{\circ} 50' E.$ Population 80,399. Provincial capital. Seat of bishopric. Chamber of Commerce. British Consul.

Position and Site (Fig. 13)

La Spezia is on a small coastal plain at the head of the gulf of Spezia. The gulf, which is $5\frac{1}{2}$ miles long and $4\frac{1}{2}$ miles wide, is unique on the west coast of Italy and affords an excellent natural harbour. Its west shore is formed by the steep rugged Portovenere peninsula, which is of dolomitic limestone and rises steeply to M. di S. Croce (1,782 ft.), its highest point. The lower slopes are cultivated in terraces with vines and olives, whilst the upper slopes have sparse chestnut woods and scattered pines. The east shore of the gulf is separated from the broad valley of the F. Magra by a sparsely wooded ridge about 2–3 miles wide, whose greatest height is M. Rocchetta (1,351 ft.), though its average height is much less.

The range of sandstone hills (c. 1,000 ft. high) which bounds the small coastal plain at the head of the gulf curves eastwards to the Magra valley, about $4\frac{1}{2}$ miles distant, and is separated from the ridge along the east of the gulf by a low gap (c. 150 ft.) followed by both railway and road. The Colle dei Vici (c. 360 ft. high), a southern spur of the hills to the north of Spezia, almost divides the coastal plain in two. The south-western part, on which the main section of the city is built, is rectangular in shape and extends about 1 mile inland from the sea and is about $\frac{3}{4}$ mile in width. The north-eastern part forms the semicircular Migliarina plain and extends inland for about 1 mile and along the shore for $1\frac{1}{2}$ miles. The south-western part is itself subdivided by the Canale Lagora into two: a rectangular western section made up of the Reale Arsenale (Royal Arsenal) and other naval and military establishments built round the two arsenal harbour basins; and an eastern section which is the main commercial and residential part of the city. The latter is for the most part laid out in large blocks along wide roads on a rectilinear ground-plan, though some large modern houses have spread on to the north-western slope of the Colle dei Vici, and a residential suburb extends north-westward along the Via Aurelia towards La Foce. On the Migliarina plain there are scattered industrial and working-class suburbs, which are for the most part either close to the shore or at the northern edge of the plain round the original village of Migliarina. The majority of the houses and factories are strung along roads, leaving large tracts of open land between them. The Ordero-Terni-Orlando factory is on the extreme

eastern edge of the plain. Parts of the south-western and north-eastern shores of the gulf are now also built over. At the heads of the numerous bays and inlets along the western shore there are various naval and military establishments and some fishing settlements. A nearly continuous string of shipbuilding yards (notably at Muggiano) and other industrial plants line the eastern shore from the head of the gulf almost to Lerici, which itself is an industrial and fishing suburb.

History

Under the Roman Empire there was a castle at La Spezia. This was acquired in the Middle Ages by the Fieschi of Genoa, who made it the centre of their dominion on the Riviera di Levante. It became a subject of contention between the houses of Fieschi and Doria until, in 1273, it was taken possession of by Genoa. Until the fall of the Republic it was ruled by a Genoese patrician, who had at first the title of Vicar, then of Captain, and in the eighteenth century of Governor. Its importance dates from 1857, when Cavour put into effect a scheme, originally formulated by Napoleon, of making it into a naval base and thus relieving the congestion in the port of Genoa. An arsenal and shipbuilding yards were constructed, and from henceforth La Spezia has been dominated by naval activities.

Public Buildings and Monuments

The Arsenal was designed by Domenico Chioldi and has been working since 1869; it has an interesting Museo Tecnico Navale. The cathedral of Sta. Maria Assunta dates from the sixteenth century. From the Giardino Pubblico the palm-lined Passegiata Constantino Morin follows the coast and commands a fine view over the gulf.

Industry

The most important industrial establishments in La Spezia are mainly connected with the Navy and comprise the Odero-Terni-Orlando armament works, the Royal Arsenal, the oil refinery, and the shipbuilding yards at Muggiano. The Odero-Terni-Orlando combine, which was previously affiliated with the British firm of Vickers and was known as Vickers-Terni, makes guns of all calibres, ships' propellers, armour plate, &c., whilst the Arsenal has a less wide range. The oil refinery possesses the only cracking plant in Liguria and treats heavy oil fractions imported from foreign refineries. The Odero-Terni-Orlando shipbuilding yards at Muggiano are capable of building light cruisers, submarines, and cargo ships, and have 6 open and 3 covered

slips. The lead smelter and refinery at Lerici on the eastern side of the bay of Spezia is also notable and has an annual capacity of 24,000 tons of crude lead and 3,300 tons of refined lead. Besides the larger engineering works there are smaller works, the most important of which make pumps and auxiliary machinery of all kinds for the Navy. The Officine Galileo have a branch manufacturing precision instruments, whilst another firm makes accumulators.

Other industrial plants include the large jute mill of the S.A. Jutificio Riuniti, which in peace-time employs about 1,000 workers, and a factory making porcelain insulators for the Italian Navy, the State Railways, and the chief electrical companies. The food industry is on a small scale, though there are pasta factories and flour-mills. There are numerous brick works in the neighbourhood.

Description of Port

The port of La Spezia lies at the head of its gulf and is the main naval port of Italy. The inner part of the gulf has been enclosed by a detached breakwater (awash except for its ends), the Diga Foranea, constructed between Punta Santa Maria and Punta di Santa Teresa, some $2\frac{1}{2}$ miles from the head of the gulf. The Diga Foranea is nearly $1\frac{1}{2}$ miles long with entrances to the harbour at each end: that on the west, which is the more used, is 1,300 feet wide with depths of 42 feet; that on the east is about 600 feet wide and has depths of 34 feet. The approaches are free of dangers.

The $4\frac{1}{2}$ square miles of water thus enclosed are known as the Outer Harbour, with the Inner Harbour and the Mercantile Port in the north-west. The shores of the Outer Harbour¹ are largely lined with quays and jetties, but depths are not great and there are few facilities. The south-west shore consists of five coves, the largest of which, the Seno delle Grazie, forms a very safe anchorage. Its south side is used for naval purposes. The northernmost cove, the Seno di Cadimare, is used as a seaplane base. The north-eastern shore of the gulf is more regular and there is a great number of quays, jetties, slipways, and basins serving the shipbuilding and industrial establishments which occupy this side of the gulf. Chief among these are the Molo Odero Terni and the Odero-Terni-Orlando shipbuilding yards, the San Bartolomeo yards, and the Molo dei Pagliari. There is a second seaplane station just south of Point San Bartolomeo.

The Mercantile Port lies north-east of the Inner Harbour, from which it is separated by the rectangular Porticciolo delle Torpidiniere.

¹ Quayage in the Outer Harbour is not described in the table on pages 246-248.

The Mercantile Port is an artificial basin of triangular shape formed by two dog-legged moles, on the south-west the Molo Italia, and on the east the Molo Duca degli Abruzzi, used mainly for coal, with a jetty extension at which oil tankers berth. The entrance between them is 840 feet wide and 31 feet deep. The quays along the north-west shore are not yet complete. In the Porticciolo delle Torpidiniere, however, quays line the whole length of the shore, and they and their jetties are used by the small steamers that serve the bay and by craft landing from ships at anchor in the Outer Harbour.

Immediately south-west of the Porticciolo delle Torpidiniere is a small rectangular basin, the Porticciolo Lagora, which is the outlet of the Canale Lagora, a stream bordering the naval dockyard on its north-east and north-west.

The naval dockyard, the Reale (or Regio) Arsenale, is, of course, the most important part of the port. It consists of an outer basin, the Darsena Duca degli Abruzzi, leading on the south-west to a small double basin, the Vasche di San Vito, on the north-west to the two basins of the Inner Port, the Prima Darsena and the Secunda Darsena.

The Darsena Duca degli Abruzzi is enclosed by three moles, the Diga di Cadimare on the south, the Molo Lagora on the north-east, and the detached Diga Est, which is built in three legs between the heads of the two first named. The main entrance is between the Diga di Cadimare and the Diga Est, and is 465 feet wide with a depth of 41 feet in the centre. The whole of the west side is lined with irregular quays, and here the Navy has its main fuel supplies: in the south-west corner are two small basins known as the Vasche di Cadimare; the Molo della Varicella, projecting at right angles to the shore, serves the coal sheds on the Molo di Marola to its north; north again the San Vito gun factory on the Calata del Guardaporto is separated from these last by the Porticciolo San Vito, another small basin giving access to the enclosed Vasche di San Vito. The north-west side of the Darsena Duca degli Abruzzi is the Banchina Scali, broken in the middle by a narrow pier and having three slipways at its north-east end.

The entrance to the Inner Port is between the Calata del Guardaporto and the Banchina Scali; it is 148 feet wide and 37 feet deep in mid-channel. The Prima Darsena to which it leads is roughly rectangular, but there is a small basin called the Baia d'Assab immediately inside the entrance on the north-east side. The Secunda Darsena, shaped like a reversed L, is reached from the Prima Darsena by a canal 394 feet long and 115 feet wide with a least depth of 34 feet.

Both basins are quayed all round and backed by the varied workshops of the naval dockyard. In the latter are the six graving-docks of the port.

Facilities. The Harbour-master's Office is with the customs-house in the Porto Mercantile near the root of the Molo Italia. The Health Office is at the head of the Molo Duca degli Abruzzi.

The Odero-Terni-Orlando yards are equipped with 15 medium hammer-headed cranes. Elsewhere in the port, other than the travelling bridge cranes for coal on the Molo Duca degli Abruzzi, most cranes are travelling or fixed jib. They are somewhat scattered. Floating equipment consisted of 4 cranes and 2 sheerlegs in 1943.

Since La Spezia deals mostly with non-perishable bulk cargoes, there are only two warehouses, one on the Calata S. Cipriano and the other on the Calata Littorio. Their total storage area is probably under 20,000 square feet, but the buildings of the Reale Arsenale could be used in an emergency. A cold store, capable of housing 7,500 tons of meat, lies behind the Calata Littorio on the north side of the Viale San Bartolomeo.

The naval and commercial supplies are kept separate. The naval oil supplies lie in three groups on the west side of the naval dockyard (Appendix II). Commercial stores are limited to the lubricants held by the State Railways near the root of the Molo Duca degli Abruzzi. Tankers secure to the jetty at the south end of that mole to discharge oil for the INPET refinery. The storage of coal is similarly concentrated in two areas. The naval supplies are in the sheds on the Molo di Marola, the area of which totals some 445,000 square feet. Only on the Molo della Varicella are there mechanical handling facilities. At its root is a coal briquetting plant with a capacity of 150,000 tons per annum. The commercial supplies are held on the Molo Duca degli Abruzzi, where the stacking space is about 170,000 square feet. The Reale Arsenale has its own supply of water. There are hydrants on the Calata Littorio and on the Molo Duca degli Abruzzi. Lighting is electric.

There are six graving-docks, all in the Seconda Darsena of the Reale Arsenale. Nos. 1-4 are on the north-east side and are numbered from south-east to north-west, while Nos. 5 and 6 are on the south-west side, numbered in the same direction.

In 1943 a floating dock, measuring 226×36 feet and with a lift of 500 tons, was in the north corner of the Seconda Darsena.

In addition to the three building slips on the Banchina Scali, there are about a score of slipways round the Outer Harbour. Three are

covered, and their capacity varies between 300 and 3,000 tons. The largest measures approximately 625×75 feet.

<i>Dock</i>	<i>Extreme length</i> <i>ft. in.</i>		<i>Length inside caisson to coping head</i> <i>ft. in.</i>		<i>Width of entrance at coping or top</i> <i>ft. in.</i>		<i>Depth on sill</i> <i>ft. in.</i>	
No. 1 . . .	354	3	341	2	70	8	29	1
No. 2 . . .	428	6	409	7	76	5	29	3
No. 3 . . .	428	6	409	7	76	5	29	3
No. 4 . . .	354	3	341	2	71	6	29	1
No. 5 . . .	702	1	687	0	105	6	33	1
No. 6 . . .	702	1	687	0	90	2	32	8

Repair facilities are widespread round the gulf, but there are four main concentrations. The chief shipbuilding yards are those of the Odero-Terni-Orlando Company at Muggiano on the east side of the Outer Harbour. North of them is the San Bartolomeo yard, while on the north shore of the Outer Harbour east of the Molo Duca degli Abruzzi are the Odero-Terni-Orlando repair shops. The fourth area is the Reale Arsenale which is very adequately equipped for all repairs. Additional services are available from the many engineering establishments in the town, chief among which are the Societa Cerpelli and the Vickers-Terni armament works.

A railway, mostly single track and not flush, but with frequent level-crossings, follows the shore of the gulf from the root of the Diga di Cadimare on the west to the San Bartolomeo shipyards on the east. There is a small marshalling yard behind the Calata Littorio, and many dead-end sidings lead on to the quays and jetties of the port, on to the Molo della Varicella and the Calata del Guardaporto, into the Reale Arsenale, on to the Calata S. Cipriano and the Molo Duca degli Abruzzi, and on to the Molo dei Pagliari. There are connexions with the main line at three points: from the south-west side of the Reale Arsenale, from the north-east corner of the gulf, and from the Molo dei Pagliari.

A main road winds along and above the south-west side of the harbour and gives exit from the quays on the west side of the Darsena Duca degli Abruzzi at a point behind the Porticciolo San Vito. The Reale Arsenale is surrounded by walls and, on two-and-a-half sides, by a canal; there are several gates on the south-west, 4 bridges on the north-west, and 2 (other than the railway bridge) on the north-east. Roads off the quays and moles round the rest of the harbour connect

freely with the Viale Umberto I and the Viale S. Bartolomeo which skirt the north-east of the gulf.

There is a small raised foot-bridge across the entrance to the Porticciolo Lagora. An arched metal bridge, divided into two swing arms, crosses the canal joining the Prima to the Secunda Darsena, while two flat bridges cross the canal leading to the Vasche di San Vito; one is a swing bridge with a single railway track, and the other, for pedestrians, slides on rollers.

Trade and Connexions. The number of ships entered and cleared in 1939 was 1,852 totalling 946,000 tons. The tonnage of goods landed and loaded in the same year was respectively 887,000 and 223,000 tons. Details of passenger traffic are not given.

The chief imports are coal and oil, metallic minerals, phosphates, and jute. Exports consist mainly of oil, pig-lead, silver, flour, wine, marble, and sandstone.

Many of the west coast shipping services call at La Spezia, and there is frequent connexion northwards to Genoa and its sailings and southwards to Leghorn and Naples.

Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
<i>Mercantile Port</i>				
Molo Duca degli Abruzzi				
East side				
(north part) . . .	10-15	840	—	Rough-faced. Not used by ships at all.
(south part) . . .	15-16½	830	2	..
West side				
(south part) . . .	24-25	610	2	Unloading coal. Travelling bridge cranes.
(projection in centre)	16½	65	1	Health offices at head of mole.
(north part) . . .	16½-22	980	4	..
Breakwater extension				
Inner arm	23-29½	240	—	Narrow breakwater, rough-faced on seaward side; coping of dressed stone on inner side.
Outer arm	23-29½	750	—	Unloading inflammable cargoes only.
Calata Littorio . . .	26	623	2	Unloading coal, phosphates, and fire-clays.
Calata S. Cipriano . .	28-29	560	—	Timber and general cargoes. Land reclamation in progress (1943) to extend quay to SW.
Harbour-master's quay .	16	205	—	Used mostly by small craft. Customs-house.
Molo Italia: inner side .	—	—	—	Seaward side rough-faced with natural blocks.
Inner arm	16½-21	660	—	..

<i>Name</i>	<i>Depth alongside (feet)</i>	<i>Length (feet)</i>	<i>No. of cranes</i>	<i>Facilities, &c.</i>
Outer arm . . .	22-24	560	—	Loading and unloading general cargo.
<i>Porticciolo Delle Torpediniere</i>				
Calata Morin . . .	5-11	1,770	—	At SW. end are two wooden piers each 130 ft. long and a small quayed mole (Molletto Ammiraglio Bonaldi) 70 ft. long.
Naval Club quay				
South-east side . .	5	460	1	} Normally used by ships' boats from ships anchored in Outer Harbour. Small craft only. Landing of naval personnel only. Leads to Canale Lagora.
North-east side . .	5½	300	—	
Banchina Revel . . .	—	—	—	
Molo Mirabello: inner side	9-10	755	—	
Porticciolo Lagora . .	6½	Basin 400 × 215	—	
<i>Reale Arsenale</i>				
Darsena Duca Degli Abruzzi				
Molo Lagora . . .	Outside 11½-15½ Inside 16½-27	1,870	—	..
Diga Est				
North arm . . .	13	780	—	..
Central part . . .	13	1,380	—	..
South arm . . .	13	510	—	..
Diga di Cadimare				
Main arm				
(north side) . .	12	1,640	—	..
North-east arm . .				
(north side) . .	25	460	—	..
Vasche di Cadimare . .	9-19	260	—	Used only by lighters and small craft.
		each side (approx.)		
Molo della Varicella (di Marola)				
South side . . .	26-30	1,150	6	Coal. Coal briquetting plant at root.
North side . . .	24-30	660		
Marola coaling quays				
South part . . .	19-26	395	—	Loading and unloading coal lighters.
North part . . .	10-16	885	—	
Porticciolo S. Vito				
South quay . . .	14	475	—	..
West quay . . .	10	165	—	..
North quay . . .	15	480	1	..
Vasche di S. Vito . . .	—	—	—	Two interconnected basins, c. 380 × 360 ft.
Calata del Guardaporto	16-24	735	—	..
Banchina Scali . . .	10-15½	1,475	—	Stern-to anchorage for battle-ships.
<i>Prima Darsena</i>				
South quay				
East part . . .	15	220	—	..
Centre part . . .	15	220	—	..
West part . . .	25	220	—	..
South-west quay . . .	25-28	915	1	Submarine repairs.
West quay . . .	25-26	360	—	..

Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
<i>Reale Arsenal (contd.)</i>				
North-west quay (Calata Veleria)	29½-30½	460	—	..
North-east quay				
North-west part . . .	22-26	540	2	Ships storing.
South-east part . . .	17	450	—	..
Baia d'Assab . . .	20½	—	—	Rectangular basin 315 × 225 ft.
North-west side . . .	17½-20	225	—	..
Wet dock (at north corner of Baia d'Assab)	17½	225 × 100	—	..
North-east side . . .	8½	180	—	..
South-east side . . .	? 16	160	—	..
Seconda Darsena				
South-west quay . . .	23½-30	1,805	1	Ships refitting before or after docking. Oil bunkering.
North-west quay . . .	23-31	920	—	..
Northern corner				
North quay . . .	27	230	—	..
North-east quay . . .	24½-32	500	—	..
South-east quay . . .	24½-26	490	—	..
North-east quay				
North-west part . . .	30	475	—	} Two parts separated by entrances to graving docks, nos. 1-4.
South-east part . . .	30	280	—	
Calata Chiodo . . .	26-29½	590	1	..
<i>Outer Harbour</i>				
Molo Odero-Terni				
North side . . .	16½ at 20 ft. off	920	2	..
Molo dei Pagliari				
South side . . .	16	425	1	..
North side . . .	16 (for outer 400 ft.)	525	1	..

Inland Communications

Railways. La Spezia is on the main double-track, electrified line from Genoa to Pisa and Rome. At Vezzano a single-track electrified line branches to Parma. Electric trams serve the city and suburbs and run to Muggiano and Cadimare, on either side of the gulf.

Roads. La Spezia lies between Genoa and Viareggio on road 1 to Rome. Road 62 goes to Parma, and road 63 diverges from it at Aulla for Reggio Emilia. There are secondary roads to Portovenere and Lerici.

Airways. There are two seaplane stations, Cadimare, on the western shore of the gulf, and Muggiano, on the eastern.

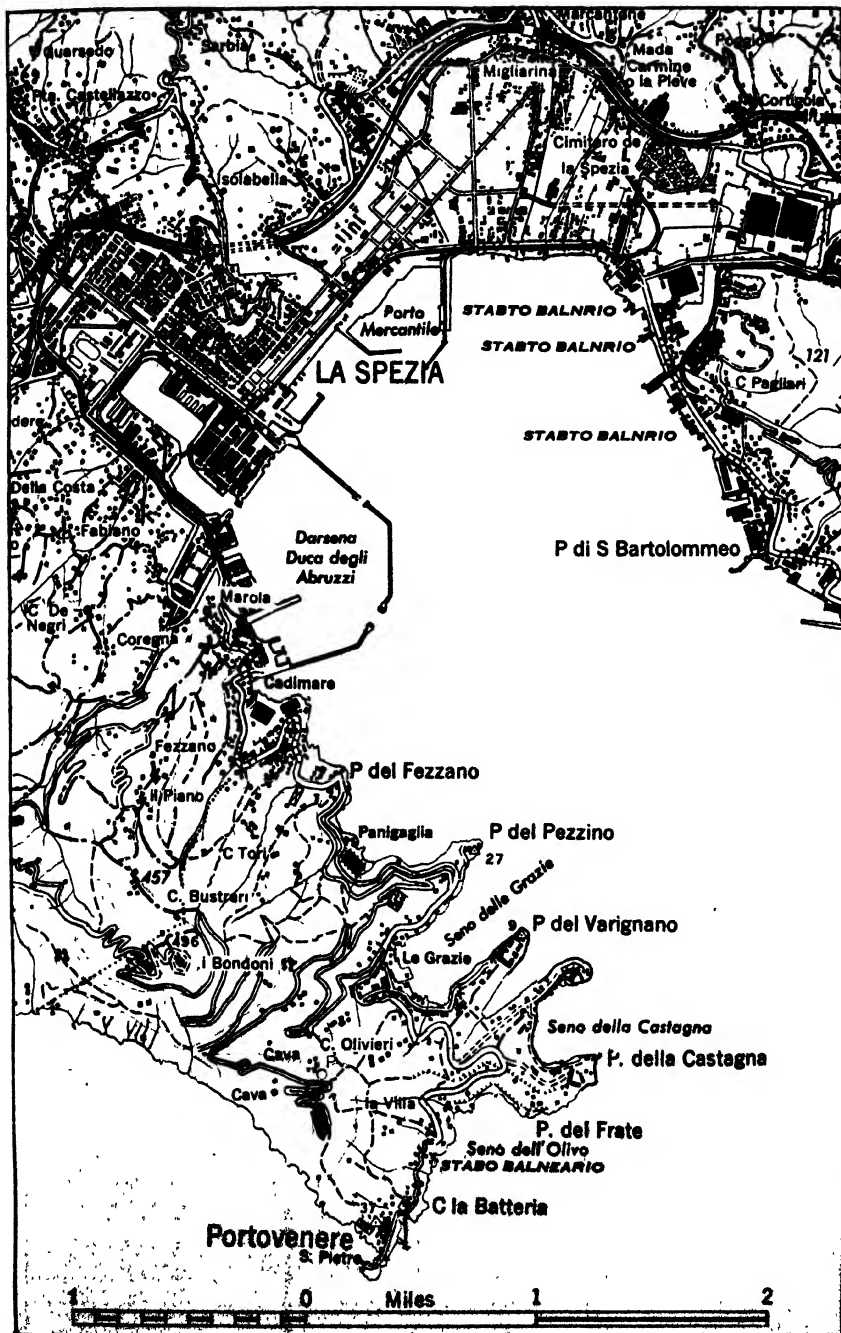


FIG. 13. *La Spezia*

VIAREGGIO. Latitude 43° 52' N. Longitude 10° 15' E. Population 30,384.

Position and Site (Plate 25)

The sea-side resort of Viareggio is situated at the southern end of the coastal plain of Viareggio where it adjoins the plain of Pisa. The plain of Viareggio, which is flanked by the steep edge of the Apuan Alps about 3 miles inland from the town, is intensively cultivated with citrus trees, olives, and vines, though parts of the plain of Pisa immediately to the south-east are marshy. Viareggio is built along the wide sandy beach which fringes the coastal plains from the mouth of the F. Magra to near Leghorn. The town is bounded on the south by the Canale Burlamacca, at the mouth of which is the harbour. The whole town is modern with wide streets laid out in a gridiron pattern, the main streets being parallel to the sea-front. There are fine pine forests along the coast to the north and south of the town.

History

Viareggio is a purely modern city. Its past history, such as it is, is associated with Lucca, whose citizens built a tower there in the twelfth century, but as late as 1741 it had barely 300 inhabitants. Its development is due to Maria Luisa of Bourbon, who as Duchess of Lucca (1817-1824) encouraged building there. To-day it is the most popular sea-side resort on the west coast of Italy, and at one time had a large English colony.

Public Buildings and Monuments

The old Torre Lucchese, dating in its present form from 1542, is now a prison. The Shelley monument recalls that, after the poet had perished in a storm at sea, his body was washed up near Viareggio, cremated in the presence of his friends, and the ashes taken to Rome for burial (1822). The Hydropathic Hospital, founded in 1861 by Giuseppe Barellai, was the first of its kind in Italy.

Industry

Viareggio is essentially a sea-side resort and industry plays a small part in the life of the town. There is, however, a shipbuilding yard where motor schooners have been built, whilst the fishing industry is not unimportant. Some artistic goods are also made in the town.

Description of Port

The small harbour of Viareggio at the mouth of the Canale della Burlamacca consists of three basins leading off the south side of the canal and an outer harbour formed by a mole and a breakwater. The mole, on the north, is an extension of the north bank of the canal; straight and quayed on the inside, it is about 1,700 feet long and 20 feet wide. Depths alongside are from 5 feet to 13 feet. The breakwater, on the south, is curved at the root and then extends north-west. Its total length is about 2,000 feet: it is rough-faced, but has a footway 15 feet wide along it.

The entrance to the outer harbour between the heads of these two is about 550 feet wide with depths of 8 feet. The outer harbour itself has depths from 9 feet to 18 feet dredged. The entrance to the canal is in the north-east corner between the mole and another shorter mole built parallel to it: it is 80 feet wide with depths of $8\frac{1}{2}$ feet, but soon decreases to 40 feet wide with depths of only 6 feet. All depths quickly decrease if dredging is not maintained. The sides of the canal are quayed and there are bollards.

The entrance to the first basin, the Darsena Toscana, is nearly half a mile up the canal and opposite the Harbour-master's and Customs office. The basin is roughly 400 feet long and 300 feet wide, and is shaped in plan like a Norman doorway. From its south-west side a passage 50 feet wide leads to the Darsena Italia, the main berthing basin, which is rectangular and measures 500 feet by 300 feet. The third basin, the Darsena Lucca, lies some 550 yards farther inland beyond a (? removable) road bridge. It is the smallest of the three basins, measuring only 290 feet by 150 feet. Depths in these basins are nowhere greater than 9 feet, and more usually they are considerably less. There are no facilities.

A new basin appears to be under construction south-west of the Darsena Italia.

Inland Communications

Railways. Viareggio is the junction on the double-track electrified line from Genoa to Rome for the single-track line to Lucca. There is an electric tram to Forte dei Marmi and Pietrasanta.

Roads. Viareggio lies between La Spezia and Leghorn on road 1 to Rome. Main roads also lead to Lucca direct and via Camaiore and also along the coast to Marina di Carrara.

LEGHORN (Livorno). Latitude $43^{\circ} 33' \text{N}$. Longitude $10^{\circ} 18' \text{E}$. Population 109,188. Provincial capital. Seat of bishopric. Chamber of Commerce and branch of British Chamber of Commerce. British Consul.

Position and Site (Fig. 14)

Leghorn, which is the port of Florence and of the lower Arno basin, is built on the extreme southern extremity of the beach-fringed plain of Pisa and 10 miles south of the mouth of the Arno. About $1\frac{1}{2}$ miles inland from Leghorn the plain ends in a wooded mountain block which curves gently south-westwards to fall steeply to the coast near Antignano, about $4\frac{1}{2}$ miles south of the city. The mountain block, about 15 miles long and just over 1,000 feet high, is separated from the rest of the Tuscan upland by a north-to-south depression which offers an alternative to the coastal route between Pisa and Cecina. The plain north of Leghorn as far as the outflow of the intricate drainage channels near Calambrone is intersected by docks, the Pisa-Leghorn canal, and by drainage canals.

The sixteenth-century town forms the nucleus of the modern city, which has spread to its east and south-east. The old part is built on a pentagonal peninsula, which is limited on its seaward side by the basins of the Darsena Vecchia and Darsena Nuovo and is bounded on its other sides by a canal, the Fosso Reale, except on the east, where the Piazza Carlo Alberto connects with the mainland. The Fosso Reale is spanned by numerous bridges. The old town is the commercial and shopping centre of Leghorn and contains the cathedral. The industrial quarters are mainly in the harbour district to its west, north, and north-east, where they extend alongside the docks, canals, and railways. The residential quarter is, for the most part, along the sea-front south of the old town, though the latter contains many large houses and blocks of flats. The residential area is gradually extending farther southwards along the low rocky coast, and now the sea-side resorts of Ardenza and Antignano are virtually suburbs.

History

The name Leghorn is probably the English sailors' version of Livorno. The city owes its origin to the Pisans, who built a castle there in the tenth century as an outpost against Saracen raids. It was several times destroyed by Pisa's rivals, Genoa and Florence, and as often rebuilt. In 1390 it was bought by Gian Galeazzo, Visconti,

Duke of Milan, and after his death by Genoa. Finally, in 1421, it was acquired by Florence, who at that time was trying to develop her maritime commerce. It was one of the four Florentine fortresses occupied by Charles VIII of France on his descent into Italy in 1494. Its prosperity dates from the sixteenth century, when Grand Duke Cosimo dei Medici began to build the new port designed to take the place of Porto Pisano, which had silted up. His work was continued by Ferdinand I (1587-1609), who built the great mole and made a proclamation of religious liberty in order to attract strangers to the city. Moors expelled from Spain, Greeks who had fled from the Turks, Roman Catholics driven from England, Italians threatened by the Inquisition, and above all the persecuted Jews found refuge there. Its trade steadily increased and Leghorn became a port second only to Genoa. During the Risorgimento, true to its tradition of liberty, it was the most radical and democratic city in Tuscany. After the formation of the kingdom of Italy, its privileges as a free port were abolished and it became a naval dockyard as well as an important centre of Italian commerce.

Public Buildings and Monuments

Leghorn is an industrial and commercial city and has no important artistic monuments. At the harbour is a fine statue by Giovanni Bandini (1595) representing Ferdinand I, Grand Duke of Tuscany, with four Moors in bronze chained to his feet. These last are by Pietro Tacca. The south façade of the cathedral was designed by Inigo Jones, but the whole building was renovated in 1856. The handsome Jewish synagogue dates from the early seventeenth century. In the old English cemetery is the grave of Tobias Smollett (d. 1771), and the church of St. George adjoining it was the first Anglican place of worship permitted in Italy. Conspicuous among modern buildings is the fine Naval Academy (1881).

Industry

The principal industries of Leghorn are shipbuilding, metallurgy, and general engineering. The Odero-Terni-Orlando combine, which here has four slips, a patent slip, and a dry dock, has shipyards capable of building cruisers, destroyers, and tankers. The Società Metallurgica Italiana, the only large Italian producer of copper alloys, has a plant here which produces fire-refined and electrolytic copper and has an annual capacity of 3,000 tons of blister copper. S.A. Moto Fides, which used to make motor-cycles, now manufactures torpedoes,

grenades, and injection pumps. Other companies make electric cables and insulated wire, insulators for power stations and transmission lines, and shells. The Azienda Nazionale Idrogenazione Combustibili (A.N.I.C.) hydrogenation plant near Calambrone, about 2 miles north of the city, is one of the two most modern oil refineries in Italy (Appendix II).

The chemical industry is important, and Montecatini have a factory for chemical manures, and the Societa Solvay a large soda plant at Rosignano Marittima which accounts for 90 per cent. of Italian output. Other large industrial establishments include a glass works, an important paint and varnish factory, cotton mills, flour mills, distilleries, and a canning factory belonging to Cirio. Other local manufactures include pasta, crystallized fruits, soap, rubber goods, furniture, and Singer sewing machines.

Description of Port

Leghorn is one of Italy's principal ports and an important industrial town built on land reclaimed over many years. A maze of canals traverse the city and connect the various parts of the port, which lies to its west and north.

The harbour is entirely artificial and is divided into four parts, the Bacino Vittorio Emanuele III (1) and the Avamporto giving access respectively to the new harbour works developing in Porto Nuovo (2) to the north, and to the various basins of Porto Vecchio (Porto Mediceo, &c.). Protection is afforded by four breakwaters, the Diga del Marzocco in the north-west, the detached crescentic Diga Curvilinea and its northern wing, the Diga della Meloria on the west, and the detached Molo Frangiflutti (Diga della Vegliaia) on the south, and a dog-legged breakwater extending westwards from the shore at the south end of the harbour and ending about 110 yards south of a short breakwater built south-west from the lighthouse on the Secca Piana.

Anchorage is available outside the port in the Rada di Livorno, inside the shelter of the Secche (or Banchi) della Meloria, a shoal about 3 miles long $2\frac{3}{4}$ miles off the shore and roughly parallel to it. Approach to the harbour is either to north or south of this shoal, and there are two entrances: the Bocca Nord, leading to the Bacino Vittorio Emanuele III between the south-west end of the Diga Marzocco and the Diga Meloria, has depths of 24 feet over a width of 200 yards; and the Bocca Sud leading to the Avamporto between the south end of the Diga Curvilinea and either the west end of the Molo

Frangiflutti or the west side of the Secca Piana where the effective width is 240 yards.

The Avamporto is bounded on the west by the Diga Curvilinea and on the east by the western mole of Porto Vecchio, the Molo Mediceo (3). Depths of 27 feet are charted in the west, shoaling eastwards. In the south-east is a rocky ledge, the Secca Piana, on which stands a lighthouse. On the shore south-east of it (and therefore not strictly in the Avamporto) is the largest building slip of the Orlando shipyards (p. 256), protected on the south by the dog-legged breakwater referred to above. In the north of the Avamporto is the passage through to the Bacino Vittorio Emanuele III, and in the east is the entrance to Porto Vecchio.

This entrance to Porto Vecchio is about 325 feet wide with depths of 24 to 30 feet, and lies between the north end of the Molo Mediceo (3) and the south-west end of the Diga Rettilinea (4). The first basin, Porto Mediceo, is the largest, and gives access to five other basins round it. Depths are about 25 feet, and quays line it on all sides. On its north the Cappellini (Porto Franco) and Firenze basins lead north-east inside the Diga Rettilinea, while at the eastern corner of the former another rectangular basin, the Darsena della Stazione Marittima, is entered by a passage 50 feet wide under a masonry bridge. In the north-east corner of Porto Mediceo is La Bocca, the narrow opening to the Darsena Vecchia. This, the fourth basin, extends in a north-south direction, parallel with the eastern side of Porto Mediceo; it is roughly 100 yards wide and is divided into two by short moles which extend from either side leaving a gap about 100 feet wide between their ends. Finally, in the south-east corner of Porto Mediceo there is the passage to the Darsena Nuova, with a swing bridge across it. This last basin is occupied entirely by the Odero-Terni-Orlando shipyard. All of these basins are interconnected by canals, which, though encumbered by bridges, also give access to the town and to the basins of Porto Nuovo.

The Bacino Vittorio Emanuele III, north of the Avamporto, lies between the Diga della Meloria on the west, the Diga del Marzocco on the north-west, and the Diga Rettilinea on the south-east. The last-named is not yet quayed on this side. There are depths of at least 25 feet in the centre of the basin, dredged along a channel leading to the north-east corner. Here the Canale d'Accesso extends north-eastwards to Porto Nuovo, and on either side is a basin; on the north, at the root of the Diga Marzocco, the Darsena dei Petroli used by tankers discharging to the oil stores north-east of the Torre del

Marzocco, and, on the south, the Darsena Pisa for the repairing of small craft. South of the Darsena Pisa is a small boat camber enclosed by the beginnings of the quay which is to line the east side of the Bacino Vittorio Emanuele III.

The Canale d'Accesso is rather more than 100 yards wide and opens into the swinging basin of the Porto Nuovo, the Bacino di Evoluzione, which in turn gives access to the Canale dei Navicelli, the Darsena C. Ciano, and the Bacino Centrale. The first is 100 feet wide with depths of 8 to 12 feet. It leads northwards to Pisa, and to its east the major part of the new construction is planned. The Darsena C. Ciano is already in service and is lined with quays. The Bacino Centrale is some 100 yards wide and leads to a second basin, the Bacino Industriale, of the same width. South-east of where the last two join is a small basin, the Darsena Ugione, used by tankers.

Quay heights are as follows: in Porto Nuovo and the Bacino Vittorio Emanuele III, 8 feet; in the Bacini Cappellini and Firenze and the Darsena della Stazione Marittima, 6 feet, except on the south-east side of the Diga Rettilinea which is 8 feet high; in Porto Mediceo, west side 2-4 feet, south side 8 feet, east side 12 feet; and, in the Darsena Vecchia, 4-6 feet.

South of the Avamporto the shore is faced with a sea wall nearly to the mouth of the R. Ardenza, and in the many coves breakwaters form several shallow boat harbours, such as the Porticciolo Nazario Sauro, east of the Molo Frangiflutti.

Facilities. The main offices of the port are in Porto Mediceo; that of the pilots behind the south end of the Calata la Bassa, and that of the Captain of the Port at the north end of the Calata della Dogana. The customs-house is also on this quay.

Most cranes are either small hand cranes or travelling jib cranes from $1\frac{1}{2}$ to 6 tons. For handling coal, however, there are four 4-ton travelling bridge cranes and one of 30 tons, and one travelling gantry crane of 20 tons capacity on the Calate Orlando and Pisa, while the Orlando building slips have 8 medium tower cranes. The peace-time floating equipment included 10 floating cranes of 15 tons, but in 1943 only 1 floating crane, 1 large and 6 medium sheer-legs could be identified.

The grain silo on the Calata del Deposito Franco has a capacity of 12,000 tons. In Porto Vecchio there is about 325,000 square feet of general storage space, mainly customs or railway transit sheds, while in Porto Nuovo there is some 35,000 square feet of space which will be increased as those basins are developed. Outside the port

area there are warehouses along most of the canals, especially in the area north-west of the Fortezza Nuova, and, north-east of the Stazione Marittima, there is a number of warehouses, including a store for inflammable goods.

The Calata Pisa is the coal depot. There are four oil installations (Appendix II), of which the chief is that of SIAP at the root of the Diga Marzocco. Oil is discharged in the Darsena dei Petroli and, for the refinery, in the Darsena Ugione. There are hydrants only on the west and east of Porto Mediceo and in the Bacini Cappellini and Firenze. Details of lighting are not known for certain. In all probability only the inner basins of Porto Vecchio are supplied with electricity.

Except for repairs to small craft in the Darsene Pisa and dei Calafati and a small slipway on the north-west side of the Canale d'Accesso, all repair facilities are centred in the Darsena Nuova, which is the shipyard of the Odero-Terni-Orlando combine. On its north side are a graving-dock and a patent slip, whose dimensions are as follows:

Graving-dock					
Extreme length .	.	.	.	.	462 ft. 1 in.
Length inside caisson to coping head .	.	.	.	.	421 ft. 8 in.
Width at entrance .	.	.	.	.	73 ft. 0 in.
Depth on sill .	.	.	.	.	21 ft. 0 in.
Patent slip					
Extreme length .	.	.	.	.	280 ft. 0 in.
Length of cradle .	.	.	.	.	250 ft. 0 in.
Depth over keel blocks:					
forward .	.	.	.	.	21 ft. 0 in.
aft .	.	.	.	.	24 ft. 0 in.

There are also 4 building slips, 3 on the south side of the basin and 1, the largest and capable of building a 500-foot cruiser, facing west outside the basin proper (p. 254). The yard is self-contained and fully equipped.

The quays of Porto Mediceo (except the Calata Sgarallino) and those of the Darsene Vecchia and Nuova are served by road only, and all traffic from the first and from the western side of the two last-named must pass over the Ponte Nuovo at the south end of the Darsena Vecchia. Bridges are frequent over the port and town canals. The basins to the north of Porto Mediceo and those of Porto Nuovo have both road and rail, though it is doubtful whether the rail tracks are flush. There are large marshalling yards at the Stazione Marittima, but all lines have to converge into the single track on the causeway in the middle of the Canale di Torretta. Connexion is made

with the main lines at two points east of the Bacino Industriale and just south of the point where the lines to Porto Nuovo take off.

Trade and Connexions. In 1939 the port was entered by 3,896 vessels of 3,964,000 tons, while the clearance was practically the same. In the same year 1,559,000 tons of goods entered and 609,000 tons were cleared, while about 13,000 passengers disembarked and 6,000 embarked.

The chief imports are coal and oil, phosphates, timber, cereals, kaolin, metals (especially copper), cellulose, skins, lubricating and vegetable oils, and cotton. Exports consist mainly of marble and alabaster, hemp, wines, cement, tiles, granite, maize, flour, olive oil, woollen goods, hides and skins, and glass.

Leghorn is a port of call on the regular weekly Genoa-Palermo, Genoa-Tunis, and Fiume-Venice-Naples-Genoa-Valencia services, while many of the sailings from Genoa to the Levant, the Middle East, and the Far East call before stopping at Naples. There is frequent connexion between Leghorn and Elba, and various Ligurian and Tyrrhenian services also serve the port.

Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
<i>Avamposto</i>				
Diga Curvilinea				
East side . . .	..	3,600	—	Ships awaiting entry or preparing to sail.
Old Seaplane Base . .	1-6	610	? 2	Disused. Crescentic camber at south end now filled in. Hand cranes. Two narrow projections in northern half.
Molo Mediceo				
West side . . .	6-14	350+990	—	Mole extends further 450 ft. north, but is only rubble on this side. Quay divided into sections by walls and buildings.
<i>Porto Vecchio</i>				
Porto Mediceo				
Calata del Molo Mediceo	..	1,230	1	Ships from Orlando yards fitting out. Naval craft. Berthing stern-to. Pilots' office behind south end of Calata la Bassa.
Calata la Bassa . .	..	330	1	
Calata Sassaia . .	..	230	—	Projects 100 yds. in front of line of Calata delle Ancore. Large tobacco warehouses to south.
Calata delle Ancore .	..	530+80	—	Ships laid up.
Calata Elba . . .	..	250	—	Small ships. At north end main landing steps, Rotononda.

<i>Name</i>	<i>Depth alongside (feet)</i>	<i>Length (feet)</i>	<i>No. of cranes</i>	<i>Facilities, &c.</i>
<i>Porto Vecchio (contd.)</i>				
Moletto	23-24	210 (south) 160 (north)	—	Coastal passenger traffic.
Calata della Dogana (Customs Wharf or Calata degli Anelli)	21-22	600	3	Mail steamers. Customs-house behind sheds. At north end, set back 100 ft., Captain of Port's office with landing steps.
Calata Sgarallino . .	5-9	860	2	Timber and fish from lighters. Cranes at east end, + 2 small hand cranes.
Bacino Cappellini (Porto Franco)				
Calata Orlando . . .	23-28	1,540	4	Marble, oil in bulk, and general cargo. Travelling cranes—1 bridge, 1 gantry, 2 jib. At north-east end projection (70 ft. × 55 ft.) separates quay from Calata Pisa.
Calata Siena . . . .	..	140+80	—	Coal and phosphates. Broken by entrance to Darsena della Stazione Marittima.
Calata del Deposito Franco	23-28	875	2	Grain, salt, phosphates; petroleum for Nafta. Two grain elevators. Grain silo.
Mole at south-west end of Deposito Franco	c. 23	150	—	..
Bacino Firenze				
Calata Pisa	17-26	490+980	4	Coal. Main dumps of port.
Calata Arezzo	15-26	110+70	—	Broken by entrance to Canale delle Industrie.
Calata Carrara	22-26	1,550	—	Sta. Marittima marshalling yards behind north-east end.
Darsena della Stazione Marittima				
Calata Massa	10-13	790	—	Barge and lighter traffic.
North-east end	10-11	190	—	Backed by Sta. Marittima.
Calata Lucca	10-13	650+75	1	Broken by Fosso della Foce.
South-west end	10	80+80	—	Broken by entrance.
Darsena Vecchia				
Scali Fascelli	14	220+130	—	Lighters and small craft only. Ruling depths 15 ft., but probably only 12 ft. in entrance.
East jetty				
North side	10	110+80	—	..
South side	7	115+50	—	..
Scalo Micheli	6	410	—	..
West side				
Southern part	8-14	450	1	..
Northern part	14	430	—	..
Darsena Nuova . . . .	..	..	..	Depths of 20-24 ft. are general. Reclamation on south-west side.

<i>Name</i>	<i>Depth alongside (feet)</i>	<i>Length (feet)</i>	<i>No. of cranes</i>	<i>Facilities, &c.</i>
Scali Novi-Lena . . .	..	720	—	Ships waiting to enter grav- ing-dock. Entrance to Fosso Reale at north end.
South side	20	480	1	Fitting-out. Building-slips at east end.
<i>Bacino Vittorio Emanuele III</i>				
Diga Meloria	c. 12	2,250	—	..
Diga Marzocco	9-15	3,600	—	Measurements of SE. side.
Darsena dei Petroli . . .	..	..	..	Depths of 30 ft. in basin.
West pier	6½-10	740	—	Oil. A short spur (75 ft. long) projects inwards from either pier, that on the west is 450 ft., that on the east 190 ft. from outer end.
North quay . . . . .	..	240+165	—	Pipe-lines to SIAP installa- tion.
East quay and pier . . .	..	410+240	—	..
Quay east of No. 29 . . .	4-6½	500	—	Depths of about 13 ft.
Darsena Pisa . . . . .	..	..	..	Small craft and lighters only.
East side	c. 10	1,220	—	Repair yard for small ships.
South end	c. 10	540	—	Two slipways in centre.
West mole . . . . .	..	190	—	..
Darsena dei Calafati . . .	..	..	—	Small boat camber with a hard backing on to the repair shops in Darsena Pisa.
Diga Rettilinea				Depths of 5-6 ft.
North-west side . . . .	..	1,750	—	Rubble surmounted by high parapet.
<i>Porto Nuovo</i>				
Canale d' Accesso				
North-west side . . . .	..	1,450	—	Only south-western 350 ft. quayed, with small slipway in centre.
South-east side . . . .	..	1,680	—	Swing bridge (100 ft. long) at north-east end across north end of Canale delle Industrie.
Bacino di Evoluzione . .	..	..	..	West side is unquayed.
North side, Calata Tripoli	29	660	1	Entrance to Canale dei Navi- celli (Pisa-Leghorn Canal) at NW. end.
South-east side, Calata Magnaie	..	c. 1,500	—	..
Darsena C. Ciano . . . .	..	..	..	Depths of 29 ft. in basin.
West quay, C. Assab . . .	..	1,240	4	..
North quay, C. Gondar . .	..	710	—	..
East quay, C. Addis Abeba	..	830	—	..
South-east quay, C. Ne- ghelli	..	740	—	..
Bacino Centrale (Meridio- nale)	..	..	..	Depths of 29 ft. in basin.
North-west side, C. Ben- gasi	19+	1,000	1	Pontoon bridge to opposite side near ferry at NE. end.
South-east side . . . .	..	c. 1,400	—	SE. side is in direct line continuing SE. side of Bacino di Evoluzione, but is curved at NE. end.

Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
Porto Nuovo (contd.)				
Bacino Industriale				
West side	4,240	1	Southern 740 ft. curved. Two short piers, 50 ft. and 25 ft., at south end. Small hand crane.
North end	325	—	
East side	3,500	—	Minerals. Small pier 30 ft. long at 1,600 ft. from southern end.
Darsena Ugione				
North side	560	—	
East end	320+60	—	T. Ugione enters: on either side of it a pier, probably with pipe-lines to ANIC refinery.
South side	200+240	—	Canale delle Cateratte enters about mid-way.

Inland Communications

Railways. Leghorn Centrale is a station on the main Genoa-Rome line. The single-track line to Colle Salvetti joins the Pisa-Vada line, which avoids Leghorn and affords an alternative route to the main line. The principal route inland branches from the Genoa-Rome line at Pisa. The Accademie Navale station is the terminus of the private electric railway to Pisa via Marina di Pisa.

Electric trams ply to Antignano and Montenero, the ascent of the latter being made by a funicular railway.

Roads. Coast road 1 runs through Leghorn, and road 67-*bis* connects east of Pisa with road 67 to Florence. There are secondary roads to Pisa Marina and Antignano.

Waterway. The Pisa-Leghorn canal is navigable for barges up to 600 tons.

PIOMBINO. Latitude 42° 56' N. Longitude 10° 32' E. Population 19,966.

Position and Site (Fig. 16)

Piombino is at the southern end of the Massoncello peninsula (M. Massoncello, 938 ft., highest point), which projects from the mainland 45 miles south of Leghorn and guards the northern entrance to the crescent-shaped gulf of Follonica. The town owes its importance to its proximity to the island of Elba, 6 miles to the south-west, whence it imports most of its iron ore.

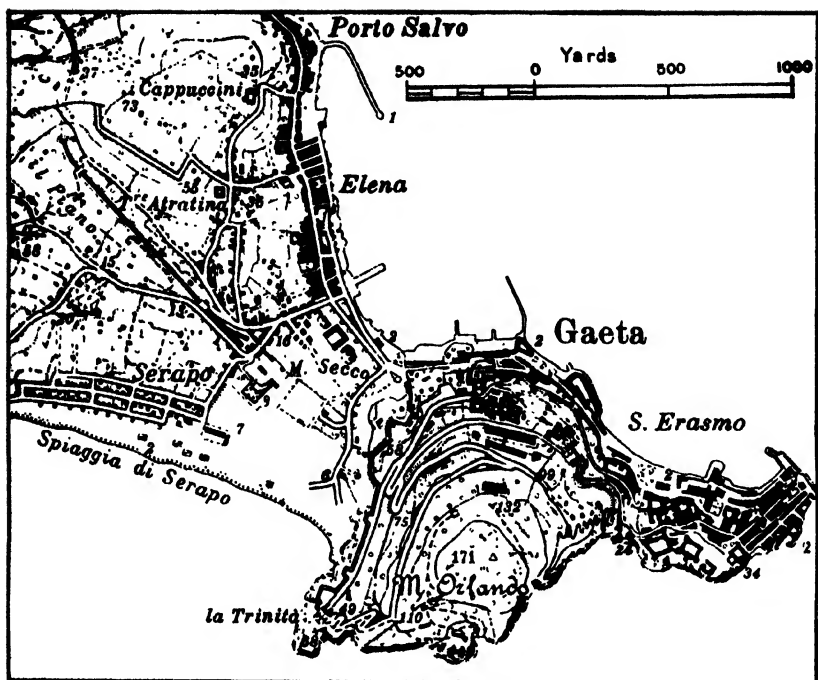


FIG. 15. Gaeta

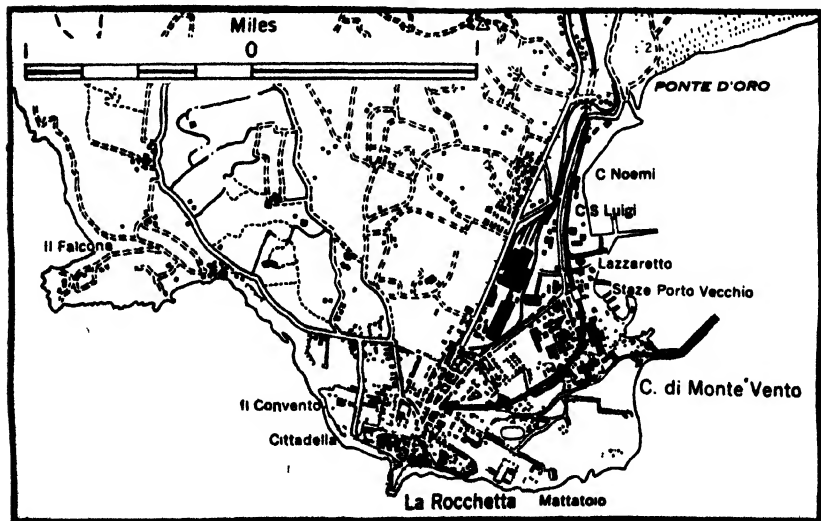


FIG. 16. Piombino

The hilly Massoncello peninsula, which is $5\frac{1}{2}$ miles long from north to south and from 1 to $2\frac{1}{4}$ miles wide, adjoins the low-lying plain of Cornia on the east. The oldest part of the town is built on the extreme tip of the peninsula, where a break in the high fringing cliffs has allowed the development of a small boat harbour. The modern industrial part of the town has grown up on the eastern and more sheltered side of the peninsula around the main harbour of Porto Vecchio. The latter extends north-eastwards round the western shore of the gulf of Follonica almost to the beach edging the Cornia plain. The main industrial establishments have developed in close proximity to this port, but are gradually extending south-westwards up a gentle slope to join the old town. The south-eastern part of the peninsula, which is hilly and reaches heights of 200 feet, is not built over.

History

Piombino is of Roman origin and was originally known as Porta Falesia. During the early Middle Ages it was subject to the neighbouring Benedictine abbey of Falesia and in 1233 was acquired by Pisa. Its position guarding the channel between the Italian mainland and the island of Elba gave it strategic importance and it became a factor in Pisan sea power. In 1399 Gherardo d'Appiano, whose father Jacopo had made himself lord of Pisa, sold the city to the Duke of Milan and was recognized in return as lord of Piombino together with Elba and other adjacent islands. Thus originated the independent state of Piombino, which lasted until 1815. It had a chequered history. Besieged by Alfonso of Aragon in 1448, it was captured by Cesare Borgia in 1501, but on his fall two years later Jacopo IV d'Appiano was reinstated. Charles V, fearing it might fall to the Turk, allowed Cosimo dei Medici to occupy it, and Florentine forces defended it against an assault from the Corsair Draghut in 1555. In 1634 Piombino passed through the female line from the Appiani to the Ludovisi, and in 1702 to the Buoncompagni. Napoleon conferred it on his sister, Elisa Baciocchi, but in 1815 it was incorporated in the Grand Duchy of Tuscany, the last Buoncompagni being compensated for its loss.

Public Buildings and Monuments

The parish church of SS. Antimo e Lorenzo dates from the fourteenth century. In the courtyard of the Cittadella is a fine marble well head (1468) and its chapel has a Renaissance façade. The Appiani palace near by has been entirely rebuilt and is now known

as the Palazzo delle Ferriere Italiane. At the northern extremity of the peninsula on which the city stands are the ruins of the Etruscan city of Populonia.

Industry

The principal industrial activity at Piombino is the manufacture and processing of iron and steel, the raw materials for which are mostly imported from Elba and Sardinia. There are two plants of great importance, both in the Porto Vecchio district. The Ilva plant mainly produces pig iron, of which it has an annual capacity of 300,000 tons, steel ingots, profiles, and rails. Ilva has absorbed the plant of the former S.A. Venezia Industrie Navali e Meccaniche, which has a metal-working shop and cast-iron and bronze foundries. The S.A. Magona d'Italia has blast furnaces with an annual capacity of 50,000 tons of pig iron, open hearth furnaces, the second largest tin-plate factory in Italy, and a sulphuric acid plant with an annual capacity of 60,000 tons. In addition to these major plants there are seven smaller metallurgical establishments, as well as a refractory products plant belonging to S.A. Toscana Prodotti Refrattari which has an annual capacity of 60,000 tons. The food processing industry is small, but includes flour mills, pasta factories, olive-oil presses, and a biscuit factory.

Description of Port

The southernmost point of the peninsula of Piombino is the rocky mole of La Rochetta. This protects a small boat harbour in the bay to its west, from which the mail boats sail for Elba, some 6 miles away to the south-west.

The main harbour, Porto Vecchio, lies to the east of the town, facing east, and is exposed to winds between east and south. It has been developed almost exclusively to serve the local iron, tin-plate, and cement works close at hand.

Ships anchor about $\frac{1}{4}$ mile east-south-east of the southern break-water of the harbour, the Molo Costanzo Ciano. This protective mole, which is still incomplete, extends east and north-east from the Punta della Batteria a total distance of some 475 yards. The Banchina Premuda extends north-west from the root of the Molo Ciano to the Pontile Elba, on the north side of which is the Darsena Guiseppe Lanini, a shallow quayed basin with two small slips. This is bounded on its northern side by a curved mole, the Darsena della Magona, which is only roughly quayed but has five jetties. Finally, to their

north a rough quay, enclosing some ground recently reclaimed and still waste, extends to the root of the Pontile Ilva.

The Pontile Ilva (Ponte Nuovo degli Alti Forni) is a masonry pier projecting seaward, east-by-north, for 250 yards. At its root is a jetty extending about 130 yards north-north-west and protecting a small basin to its west. The south quay of this, the Darsena Ilva, is broken by five projections, each 35 feet wide and 45 feet long and about 70 feet apart, and there are mechanical handling facilities for coal and ore, as on the Pontile Ilva. The western quay is straight, and at its northern end is a narrow jetty 25 yards long beyond which the shore is unquayed.

Facilities. The port has been mainly developed to handle coal and ore, and as a result the few facilities are almost entirely concentrated on the south quay of the Darsena Ilva and its extension the Pontile Ilva. There are, for instance, believed to be some small cranes on the ends of the jetties on the Darsena G. Lanini, but they are unimportant in comparison with the 3 portal travelling cranes and the 2 coal shutes on the Pontile Ilva, and the 5 fixed transporter cranes with coal shutes and the 2 travelling jib cranes on the south quay of the Darsena Ilva. Storage is limited to a few small sheds and one warehouse (315 ft. \times 40 ft.) near the west quay of the Darsena Ilva, and there is no supply of fuel oil. Repair facilities are confined to the small patent slip south of the root of the central curved mole, and to the small repair yard with its narrow slip just to the south again.

The southern half of the harbour can be cleared only by the road which runs westwards into the town: the many railway lines are merely decauville tracks leading from the jetties into the Magona plant. In the northern half of the harbour, on the other hand, the quays and piers are only served by rail: tracks link them with the main lines parallel to the shore and with the many tracks of the Ilva steel works. The railway serving Piombino connects northwards to the main Pisa-Rome line at Campiglia.

Trade and Connexions. In 1939, 2,918 ships totalling 695,000 tons entered and cleared the port, while the goods discharged amounted to 729,000 tons and those loaded to 168,000 tons. Some 38,000 passengers passed through the port in both directions. Imports consist mainly of iron ore (from Elba), manganese, scrap iron, and coal, while exports are chiefly iron pipes and castings, steel, tin-plate, and cement.

Piombino is a port of call on the twice-weekly Leghorn-Elba-Pianosa service. There are sailings to and from Porto Ferraio (Elba)

twice daily except on Sunday, when there is only one service, and once daily to and from Porto Longone (Elba) except on Sundays.

Name	Depth alongside (feet)	Length (feet)	Facilities, &c.
Molo Costanzo Ciano . . .	..	..	Quayed on the inside only. Un- finished.
Inner section . . .	c. 22	c. 525	..
Outer section . . .	c. 30	c. 750	..
Banchina Premuda . . .	c. 15	c. 420	..
Pontile Elba . . .	..	..	A projection about 50 yds. square breaks the NW. side.
South-east side . . .	c. 17	c. 200	
North-west side . . .			
Outer section . . .	c. 17	c. 190	
Inner section . . .	c. 5	c. 210	..
Darsena G. Lanini . . .	..	..	Waste ground at north end, with a small wooden jetty with concrete head, a narrow repairing slip, and a small patent slip.
West quay . . .	c. 5	c. 200	
Darsena d. Magona . . .	..	c. 900	Length of jetties (south to north), 100 ft., 130 ft., 180 ft., 250 ft., 375 ft. The third has a 'T' head c. 160 ft. long. Depth at head, c. 12 ft. Quay south of fifth jetty known as Ban- china Savino Barani.
Pontile Ilva . . .	..	..	Well-equipped with cranes (see 'Faci- lities') and served by 4 railway lines. Coal and ore.
South side . . .	5½-24	c. 750	
North side . . .	4-25	c. 750	
Darsena Ilva . . .	..	..	Coal and ore. South quay face broken by 5 projections: well-equipped with cranes and railway tracks. Construc- tion still in progress at south end of west quay.
East jetty . . .	..	c. 390	
South quay . . .	c. 14	c. 630	
West quay . . .	12-17	c. 920	
North-west jetty . . .	..	c. 75	

Inland Communications

Railway. A single-track electric line runs from Piombino to Cam-
piglia Marittima, a junction on the main Pisa-Rome line.

Roads. Secondary roads run north to S. Vincenzo and north-east
to Venturina, both on road 1 between Leghorn and Grosseto.

CIVITAVECCHIA. Latitude 42° 5' N. Longitude 11° 47' E. Population
24,822. Seat of bishopric. Chamber of Commerce.

Position and Site (Fig. 17)

Civitavecchia, the port for Rome and the cities of Umbria, is
situated on the Tyrrhenian coast about 40 miles north-west of the
metropolis. The town is built near the southern end of the narrow
coastal plain which curves south-eastwards from the Laguna di
Orbetello. Immediately east of the town the cultivated plain slopes
gently up to the foothills of the M. della Tolfa which reach heights

of about 1,600 feet about 10 miles inland and only 5 miles to the south extend right down to the coast near S. Marinella. Here the coast turns abruptly eastwards before curving southwards to the delta of the Tiber. The low coast both north and south of the artificial harbour of Civitavecchia is often rocky or rock-fringed, and is crossed by numerous small streams, several of which flow through the town itself.

The modern town with its broad paved streets is built round the nucleus of ancient houses and fortifications near the artificial harbour. The administrative buildings surrounded by spacious grounds are in the northern part of the town, the commercial quarters in the older and more central part, and residential houses and hotels in the more southern part. Several large factories and a big penitentiary are situated north of the town, whilst S. Marinella to the south is a sea-side resort.

History

Civitavecchia is the Roman Centumcellae, a port constructed by the Emperor Trajan. In A.D. 812 it was destroyed by the Saracens, but after Leo IV's victory at Ostia in 849 the inhabitants, who had been driven from their homes, returned to the 'old city', which was henceforth called by that name—Civita vecchia. It was nominally subject to the Papacy, and was the nearest port to Rome, but it was for long dominated by the di Vico family, who refused to allow the Pope to land there on his return from Avignon. Only in 1431 did the Papacy obtain full possession of the port. French troops landed here in 1849 to attack Garibaldi's Roman Republic, and again in 1867–1870 to defend the temporal power during its last years.

Public Buildings and Monuments

The modern church of Sta. Maria, built on an ancient site, is the mother church of the city. S. Francesco is a fine church of the second half of the seventeenth century. The most interesting part of Civitavecchia is the port, of which the fortress was designed by Bramante for Julius II in 1508, continued by Michelangelo, and completed by Sangallo for Paul III. The Arsenal was constructed for Alexander VII by Bernini.

Industry

There are only two important industrial establishments, the cement works of the Italcementi and a chemical works of S.A. Montecatini,

believed to make aluminium and chemical fertilizers. The three other chemical works, the soap factory, two other cement works, four foundries and machine shops, the hosiery mill, and the three saw-mills are of much less importance. The food industry is not notable, though there are flour mills, an olive-oil press, a liqueur distillery, and soda-water factories. Fishing, however, is of considerable local importance.

Description of Port

The port of Civitavecchia opens north-west and is protected on the south and west by a long dog-legged outer mole and on the north by the Molo del Littorio. The best outer anchorage is about $\frac{1}{2}$ mile north-north-west of the head of the outer mole, but it is subject to weather. The approaches are free from obstruction. The harbour entrance is between the head of the outer mole and that of the Molo del Littorio, and is about 400 feet wide with depths of 23 to 33 feet.

The outer mole leaves the shore just south of the Forte di Michelangelo and extends, as the Antemurale Sud or Diga d'Interclusione, about 500 yards westwards before turning north-westwards for another 1,000 yards. This outer leg is in three sections, the Antemurale Umberto I,¹ the Antemurale di Traiano, and, north-west of the Forte del Marzocco, the Antemurale C. Colombo, which is still incomplete. Most of the outside is faced with rough blocks, but the inside is quayed in sections for the whole of its length. The first three sections are served by rail, but the parapets, footways, and road are somewhat complex.

The harbour area consists of four basins, the Avamporto or, as it is usually called, the Bacino del Littorio, giving access to the Bacino Michelangelo, from which lead respectively south and north the Darsena Umberto I and the Darsena Romana. Most of the first three is dredged to a depth of 28 feet.

The main part of the Bacino del Littorio is roughly rectangular, lying opposite a spur at the south-east end of the Antemurale C. Colombo, and between the Molo del Littorio on the north-west and the Molo del Lazzaretto on the south-east. The former mole is quayed on the head and inside, but not yet equipped: the latter is scheduled for removal when the north-east side of the basin and the north side of the Bacino Michelangelo are straightened and developed.

The Bacino Michelangelo is the largest basin of the port. The

¹ A submerged breakwater lies parallel to the Antemurale Umberto I and about 150 feet off. It is covered by some 15 feet of water.

quays which line it are broken, in the north by the jetty which projects south-east from the root of the Molo del Lazzaretto and by the entrance to the Darsena Romana, on the east by the Pontile Sardegna, and in the south-east corner by a patent slip, the Cala Laurenti. The Darsena Romana is entered by a passage 50 feet wide and 18 feet deep: its quays, which are used mainly by fishing-boats, are very narrow and shut in by high walls and buildings. The Pontile Sardegna is, as its name suggests, used almost exclusively by passenger and mail steamers in the Sardinia service: on it is the Stazione Marittima. The basin is bounded on the south-west by the broad Molo del Bicchiere with its salt and grain silos and the main warehouses of the harbour. To its south-west is the Darsena Umberto I, which lies between it and the first two sections of the outer mole.

Quay heights are from 3 to 6 feet: 6 feet along the Molo del Littorio, 5 feet on the north side of the Bacino Michelangelo, 4 feet in the Darsena Romana, 3-4 feet on the east side of the Bacino Michelangelo, 5 feet along the Pontile Sardegna and the quays to its south, and 5 feet on the Molo del Bicchiere and along the outer mole.

The whole harbour suffered considerable damage from aerial bombing in 1943.

Facilities. The Captain of the Port's office is at the north end of the Banchina Bernini. The pilots' office is on the Calata Principe Tommaso, and their look-out station is on the Forte del Marzocco. The customs office is in the Via del Arsenale.

The location of the few cranes is given on p. 269 so far as it is known. All are jib cranes. In addition, there are 2 gantry bucket elevators for grain and salt, presumably on the Molo del Bicchiere, 2 travelling electric gantries for coal, a sheerlegs pontoon capable of lifting 70 tons, and a grab lighter for bunkering.

Most sheds and warehouses are to be found in the Bacino Michelangelo: behind the Calata Principe Tomaso there are several small warehouses and sheds; on the Pontile Sardegna there is an open-sided transit shed and there are two small sheds at its root; on the Molo del Bicchiere there are a transit shed and two warehouses, the latter providing some 18,000 square feet of space and cold storage of a capacity of 850 tons. There are also two silos, one for grain with a capacity of 11,000 tons, and the other for salt with a capacity of 5,000 tons.

Stocks of coal are maintained, but no details of quantities are known. Oil is stored in the tank at the north-west end of the Banchina

Traianea (Appendix II). Its capacity is between 4,000 and 4,500 cubic metres, and there are pipe-lines to it along the Banchina Traianea. There are hydrants on all the main quays, and water-boats are normally stationed in the harbour. Details of the lighting are uncertain, but electric lighting is probably available where there are electric cranes.

Only small craft and lighters can be serviced in the port. Anything larger and major repairs would have to be dealt with at Leghorn or Naples. There are three patent slips only: one in the south-east corner of the Bacino del Littorio which is 100 feet \times 100 feet in size; one in the south-west corner of the Darsena Romana; and one in the south-east corner of the Bacino Michelangelo, the Cala Laurenti, 40 feet by 120 feet. A small floating dock was normally berthed along the north quay of the Darsena Romana; its dimensions are as follows:

<i>Extreme length</i>	<i>Width of top at entrance</i>	<i>Depth at sill</i>	<i>Lifting capacity</i>
<i>ft. in.</i>	<i>ft. in.</i>	<i>ft. in.</i>	<i>tons</i>
232 8	36 10	16 1	500

Clearance by road is good from all parts of the port except the Molo del Lazzaletto and the Darsena Romana, which are shut in by buildings, and from the outer mole, where the roadway is frequently constricted. Railway lines run along the outer mole as far as the Forte del Marzocco, on to the Molo del Bicchiere, and along the east side of the Bacino Michelangelo. There is a small marshalling yard on the Banchina Traianea, and the main yard is south of the Forte del Michelangelo. The three groups of port lines meet at its eastern end and continue along the shore to join the main Pisa-Rome line about $\frac{1}{2}$ mile farther south-east and just beyond the town station.

Trade and Connexions. Civitavecchia is the main port for Rome and Terni and occupies a major position in the Sardinian trade. It is also a fishing-port of some importance.

In 1939 the ships both entering and clearing the port numbered about 1,650, with a total of about 3,800,000 tons. As usual, imports were far in excess of exports, the two figures being respectively 1,032,000 tons and 142,000 tons. In the same year 138,945 passengers disembarked and 142,861 embarked.

The quantity of coal and coke imported was four times as great as the total of all other imports, which include cereals, cellulose, metals and scrap, phosphates, mineral oil, timber, and fish. The chief items of export are barrel staves, straw and hay, charcoal,

cement, and sulphuric acid. Most goods are still handled by lighters and not direct to and from the quays.

There are daily sailings to and from Sardinia, and Civitavecchia is a port of call on the weekly Genoa-Sardinia-Sicily-Tunis line. One of the Genoa-Fiume coastal services calls southbound every other week.

<i>Name</i>	<i>Depth alongside (feet)</i>	<i>Length (feet)</i>	<i>No. of cranes</i>	<i>Facilities, &c.</i>
<i>Bacino del Littorio</i>				
Antemurale Colombo (Molo di C. Colombo)	9-11	c. 620 + 600	—	An extension WNW. for 325 ft. under construction.
Molo del Littorio				
South-west end, head . . .	c. 28	230	—	..
Banchina Littorio . . .	c. 28	620	—	Semicircular landing-steps at NE. end.
North-east side . . .	..	..	—	Bay used for careening. Facing wall from steps at root of Banchina Littorio is start of new quay. Patent slip for lighters at SE. corner.
<i>Molo del Lazzeretto</i>				
North-west side . . .	1	..	—	Rowing-boats only.
Banchina Apollodoro				
South section . . .	c. 11	c. 265	—	..
Centre section . . .	c. 5	c. 390	—	..
North section . . .	c. 15	c. 180	—	..
Banchina S. Barbara . . .	c. 16	c. 345	—	..
Banchina ex Punto Franco.	c. 18	c. 540	—	Fish market behind SE. part.
South-east quay . . .	c. 18	c. 130	1	..
<i>Bacino Michelangelo</i>				
Molo del Lazzeretto (SE. side)				
South-west quay . . .	c. 11	c. 83	—	..
Jetty . . .	11-26	130	—	50 ft. wide. U-shaped head.
North-east quay . . .	c. 11	c. 80	—	..
Banchina S. Teofanio . . .	c. 3	300	—	..
Banchina Colonna . . .	c. 11	165 + 130	—	..
Calata Principe Tommaso .	6½-20	550	—	..
Pontile Sardegna . . .	c. 23	230	—	80 ft. wide. Passengers and mail. Stazione Marittima. Inner half almost entirely covered by open-sided transit shed. 2 warehouses at root.
Banchina Bernini . . .	c. 6	250	—	Captain of Port's office at NW. end. Patent slip, Cala Laurenti at SE. end.
Banchina Michelangelo . .	c. 14	400	—	Hard set back at NE. end. Forte di Michelangelo behind.
<i>Molo del Bicchiere</i>				
North-east side, Banchina Gugielmotti	c. 18	750	—	Quay clear; good stacking space.
Head . . .	c. 24	200	—	Deep-sea fishing trawlers.

Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
<i>Darsena Romana</i> . .	..	..	..	Entrance from north side of Bacino Michelangelo, 50 ft. wide and 18 ft. deep. Small craft only. Fish.
<i>Darsena Umberto I</i> Molo del Bicchiera Banchina A. Cialdi . .	c. 26	800	2	1 grain elevator. Backed by silos and warehouses.
East quay . .	c. 15	180	—	..
Banchina G. Marconi . .	c. 15	460	—	Coal. Western end of quay curved.
Banchina Umberto I . .	c. 20	490	4	Oiling berth. Pipe-line to oil tank.
North-west quay . .	c. 5	130	2	Oil tank behind.
Banchina Traianea . .	c. 27	650	4	Small marshalling yards, 5 sidings.

Inland Communications

Railways. Civitavecchia is on the main double-track electrified line from Pisa to Rome. A single-track line leads inland via Capranica-Sutri to Orte, a junction on the Florence-Rome line. The port station, Civitavecchia Marittima, is used by the trains connecting with the daily mail steamers to Sardinia.

Roads. Civitavecchia lies between Grosseto and Rome on road 1. There is a secondary road to Bracciano.

GAETA. Latitude $41^{\circ} 13' N$. Longitude $13^{\circ} 34' E$. Population 17,942.
Seat of archbishopric.

Position and Site (Fig. 15)

Gaeta, about 40 miles north-west of Naples, is built on the north side of the M. Orlando promontory, which divides the gulf of Gaeta in two and forms the western limits of the bay of Formia. The town is in two parts, the old walled city of Gaeta proper, or S. Erasmo, and the open town of Elena, or Porto Salvo, built about 200 years ago when Saracen raids had become less of a menace. The promontory consists of a low rocky projection (c. 6–110 ft.), dominated on the west by the rugged and steep M. Orlando (613 ft.). This is connected with the main M. Arunci massif by a low neck of land fringed on the south by a beach, the Spiaggia di Serapo, and on the north by the port of Elena. The old town of Gaeta, which consists of tightly packed houses served mainly by narrow alleys and lanes, is built on the rocky eastern

projection and up the lower northern slopes of M. Orlando. Gaeta S. Erasmo is the military, naval, and commercial part of the town. Elena stands on a narrow coastal strip along the road leading to the main coastal routes, although some houses have extended inland up the gentle hill-slopes which are covered with olives, vines, and fruit-trees, and reach heights of 400 feet about 1 mile from the town. Elena is the industrial quarter, besides housing most of the agricultural workers of the region. Immediately north of Elena there is a bathing resort, whilst Serapo, close to the Spiaggia di Serapo, is also a small sea-side resort.

History

According to Virgil, Gaeta owes its name to Caieta, the nurse of Aeneas. It was a favourite site for Roman villas, Nero and Antoninus Pius being among the emperors who had villas there. Its position made it a natural fortress and in particular a place of refuge from the Saracens. From 867 to 1140 it was independent under its own dukes, one of whom, Giovanni I, received the title of imperial patrician from Constantine VII in recognition of his victory over the Saracens in the valley of the Garigliano (916). In 1140 it fell to the Normans. During the struggle between Frederick II and the Papacy it was frequently besieged and changed hands several times. In the Neapolitan succession wars of the fifteenth century it was occupied by the Genoese Admiral Torello, sent by the Duke of Milan in support of Queen Joanna II. Alfonso of Aragon, when besieging the city from the sea, was surprised and taken prisoner by the Genoese off the island of Ponza (1435). After his final victory over the Angevins, Alfonso did much to strengthen the defences of the city. In the sixteenth century when France and Spain vied for the kingdom of Naples, it was the last stronghold to remain in the hands of Louis XII of France. When Gonsalvo di Cordova entered Gaeta in 1504, after his victory at the Garigliano, French rule in the kingdom was at an end. In 1707 it was taken by the Austrians after a three months' siege, and in 1806, aided by an English fleet, it resisted a fierce attack from the French under Massena. Thither on 25 November 1848 Pope Pius IX fled from Rome, and for nearly a year Gaeta was thronged with cardinals and ambassadors. Pius IX published his encyclical on the Immaculate Conception (1849) at Gaeta. In 1860-1861 Francis II of Naples was besieged there for 93 days by Italian forces under Cialdini. When, after surrendering on honourable terms, the king was taken off on a French vessel, the Bourbon kingdom ceased to be.

Public Buildings and Monuments

The cathedral of S. Erasmo was founded in 1106 by Pope Pascal II and rebuilt in 1792; it has a beautiful Easter candle-stand in marble, dating from the thirteenth century. The most outstanding monument in Gaeta is the campanile, its lower part forming an open arch supported by Roman columns, its upper stories dating from the twelfth and thirteenth centuries. The present church of S. Francesco was built on the ruins of the original Franciscan church at the request of Pope Pius IX. The Castello is largely the work of Alfonso I of Aragon. On the summit of Monte Orlando is the Torre Orlando, originally the tomb of Munatius Plancus, the friend of Cicero and Julius Caesar, and now a signal station.

Industry

Gaeta has an important fishing industry, and 860 fishing-boats with a total tonnage of 1,733 were registered there in 1939. Sailing-boats are built in Elena, where there is also a notable glass-works. Horticulture is important locally.

Description of Port

The port of Gaeta lies partly on the north side of the M. Orlando promontory and partly on the north-west. The former part is known as Porto S. Erasmo and consists of two basins, and the latter as Elena. The anchorage faces east and north-east and, although not commercially important, has recently been developed for the use of the Navy. The approaches are unobstructed and anchorage is safe, with many mooring buoys.

The eastern limit of Porto S. Erasmo is a quayed mole known as Punta dello Stendardo which protects the Porticciolo di Santa Maria to its west. This small basin, which extends to the Punta della Sanità about 600 feet to the west, is quayed, but only in short lengths. To its north-west the shore is roughly quayed in irregular stretches for a distance of approximately 900 yards, and there are two jetties, one for naval personnel and one for coal. The second basin, Porto Militare di S. Antonio, is also protected on its east by a mole, the Molo di S. Antonio, which is dog-legged, quayed on the inner side, and, with the extension being constructed in 1939, some 600 feet long. To its west are two quays, the more westerly set forward about 50 feet, and from each a jetty projects northwards.

West of these quays a sandy coast trends north-west for nearly 300 yards to the short quay from which the Pontile Costanzo Ciano

projects. This, the southernmost work of Porto Salvo, extends east-north-east for about 380 feet. North from it the shoreline is irregular and backed by a sea-wall. The many short piers afford the only landing, and even so, depths are very slight. Some 850 yards north of the Pontile Costanzo Ciano is the main protective work of this basin. A rough masonry mole, the Secca Colonna, has been built eastwards from Punta Mulino at the north end of the town, then to curve south-east for a total distance of 1,100 feet.

Most of the quays are probably between 3 and 4 feet above high water, except in the Porticciolo di Santa Maria where they are 6 feet high. Ships normally berth stern-to, since alongside depths are not great, and lighters are used for loading and discharging.

<i>Name</i>	<i>Depth alongside (feet)</i>	<i>Length (feet)</i>	<i>Facilities, &c.</i>
<i>Sant' Erasmo</i>			
Porticciolo di Santa Maria .	..	..	Eastern part called Magnamanica, western part Porta West, inner side of Punta dello Stendardo.
East quay			..
North section . .	c. 10	c. 130	..
South section . .	c. 10	c. 130	..
South-east quay . .	5-10	c. 275	..
South quay . . .	c. 10	c. 160	Western portion set forward. Health offices on Punta della Sanita to its west.
		+140	
Porto Militare di San Antonio			
Molo di San Antonio .	..	..	East side rough blocks; no berthing.
(west side)			
Outer arm . . .	c. 18	c. 450	..
Inner arm . . .	c. 11	c. 150	..
South quay			
Eastern section . .	c. 15	c. 200	..
Jetty	15-20	c. 120	Depths of 26 ft. at head.
Western section . .	c. 18	c. 200	..
West quay			
East face . . . .	..	? 50	..
North face . . .	c. 19	c. 200	..
Western jetty . .	17-19	c. 150	Forms western boundary of port. Depths of 26 ft. at head. Northwards harbour dredged to 28 ft. for radius of 370 yds.
<i>Porto Salvo</i>			
Pontile Costanzo Ciano .	..	..	Depths at head c. 10 ft. Reported to be used as part of seaplane base.
South-east side . .	5-10	c. 380	..
North-west side . .	c. 10	c. 380	..
Secca Colonna . . .	c. 12	c. 1,100	Not suitable for berthing.

The port is ill-equipped, for there are no cranes, warehouses, docks, or slipways, and only small repairs can be executed. Water is laid on to the quay of Punta dello Stendardo, but other hydrants are the property of the Navy, as are any stocks of coal and oil. The

branch railway line from Formia terminates nearly $\frac{1}{2}$ mile from the root of the Pontile Costanzo Ciano and there are no spurs to the shore. Egress by road from Porto Salvo is easy, but the roads of Porto S. Erasmo are narrow and there is but one exit to the mainland. There is a service four times a week to Ponza.

Inland Communications

Railway. A single-track line connects Gaeta with Formia, a station on the Rome-Naples direct line.

Road. A road from Gaeta joins the Via Appia at Formia.

Airways. There is a seaplane base at Porto Salvo.

NAPLES (Nápoli). Latitude $40^{\circ} 50' N.$ Longitude $14^{\circ} 16' E.$ Population 739,349. Provincial capital. Seat of archbishopric. University. Chamber of Commerce and British Chamber of Commerce. British Consul-General.

Position and Site (Fig. 19; Plates 27 and 28)

Naples is on the northern shore of the gulf of Naples at the head of the bay of the same name. The gulf, which forms a deep embayment, is almost unique on the west coast of Italy since it is well protected from the open sea. The shores of the gulf are mostly backed by hills and mountains (I, Plate 110). A great part of Naples, however, is built on lowland in a gap between the volcanic and crater-pitted Campi Flegrei (highest point 1,591 ft.) on the west and the volcanic cone of Vesuvius on the east, though much of the western and north-western parts of the city have spread on to eastern spurs and foothills of the Campi Flegrei. The gap slopes very gradually inland, and north of the city broadens into the intensively cultivated and densely populated Terra di Lavoro. The great fertility of the surrounding country, the natural harbour, and the control of several important gaps across the Apennines have contributed greatly to the growth of Naples.

The ancient city was built due north of the present-day Porto Mercantile and at the foot of the eastern spurs of the Campi Flegrei. The Roman city was probably contained in the area now surrounded by the Via Foria on the north, the Via Costantinopoli, the Via S. Sebastiano, and the Via S. Chiara on the west, the Corso Umberto I on the south-east, and the Via Pietro Coletta and Via Castelcapuano on the north-east. The present plan of this part of the city still bears traces of the Roman grid-iron pattern with roads intersecting at right

angles. Valentinian III (450-455) built walls round the city which did not expand beyond the Roman limits until the tenth century. In the twelfth century the Normans built the fortress of the Castel dell' Ovo on the small island of Megaris, about a mile south of the ancient city. Under the Angevins the city expanded considerably when a new and fashionable suburb was built southwards from the ancient gate of Porta Petruccia (church of S. Maria Nova) to the shore near Castel dell' Ovo. In the centre of this suburb Charles I built the Castel Nuovo (1279-1284). In the fourteenth century another castle was built on the steep-sided hill of S. Elmo (817 ft.), which dominated the new suburb on the west. When the Aragonese became masters of the city in 1435 they made it the capital of the Sicilian kingdom, and brought such prosperity that the city increased in size and more embracing city walls had to be constructed. The east wall extended from the present church of S. Maria del Carmine to Porta S. Gennaro. Part of this wall can be seen to-day along the Via Rossaroli. The western wall followed the present Via Roma from near the Castel Nuovo in the south to near the Porta Reale (Piazza del Gesu) in the north. The walled city reached its greatest extent after the building of the walls of 1537-1550, when new suburbs grew up along the roads leading from the various city gates. The Spaniards also created a new quarter (Montecalvo) with a network of small rectangular streets on the lower eastern slopes of the hill of S. Elmo and built the long straight street originally known as the Via di Toledo (after its builder) and now as the Via di Roma.

In 1734, after the reunion of Naples and Sicily as one kingdom, the city again became the capital and new building schemes were undertaken. Charles III built a fine palace at Capodimonte on an eastern spur of the Campi Flegrei immediately north of the main part of the city. Amongst other new buildings of the period were the large theatre of S. Carlo and the Albergo dei Poveri, whilst the wide Via Foria was also constructed. Under Murat and Ferdinand II there was further building.

The development of the city was never on a set plan before the present century. The old town by the harbour was until recently a dense maze of narrow streets and alleys with high dark houses, whilst the large houses in the Roman and Spanish quarters east of the Via di Roma often stood on ground undermined by quarries and many either seemed about to, or actually did, fall in. The construction of a broad street, the Corso Umberto I (Rettifilo), in 1884 helped to make the harbour quarter more airy.

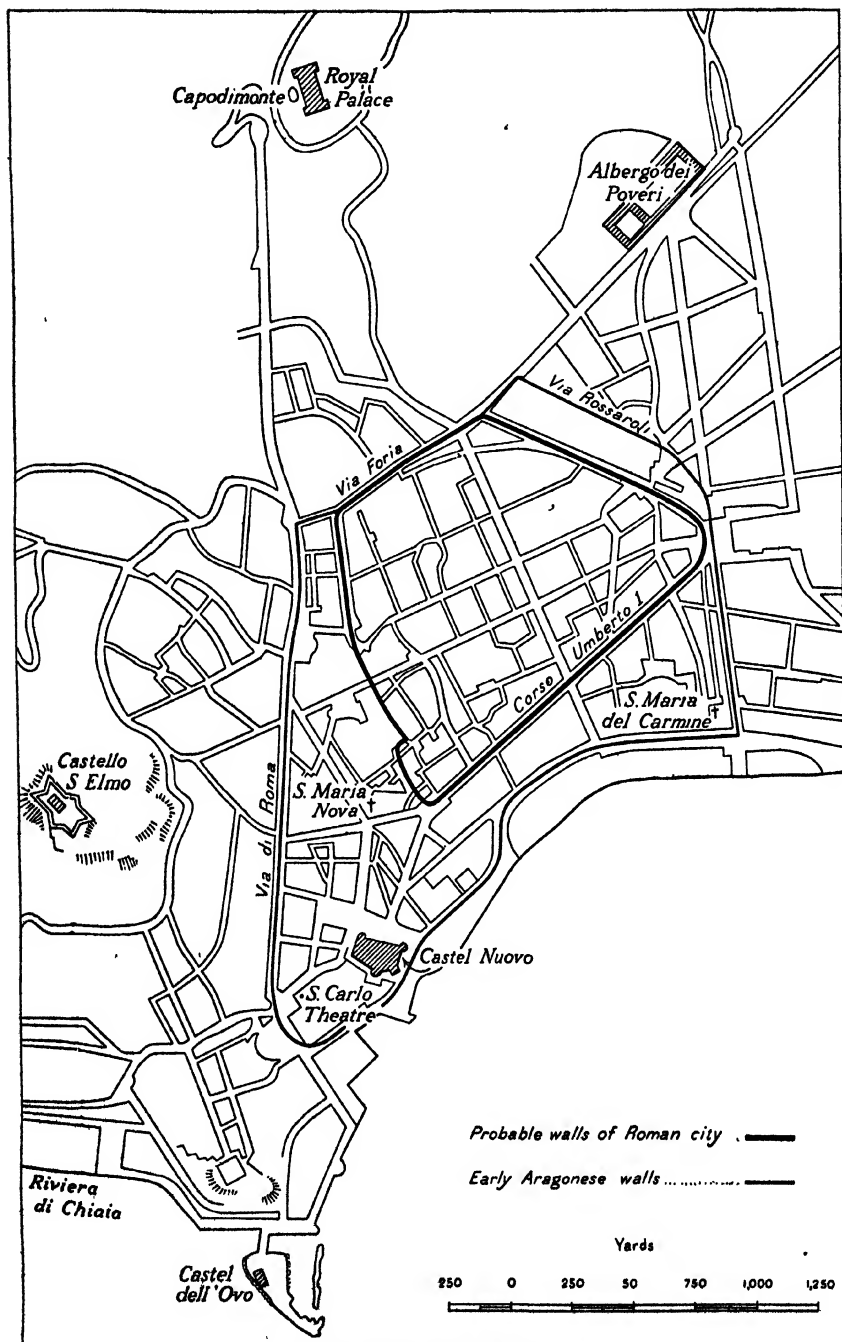


FIG. 18. Roman and Medieval Naples.

During the present century the city has expanded in all directions, but in a more planned manner. On the hills west of the old city and the Castel S. Elmo the new suburb of Vomero (817 ft.) has grown up, with streets and modern houses arranged on a grid plan. A high-class residential area has developed along the famous Riviera di Chiaia, a world-famous street to seaward of which is the Villa Nazionale with its aquarium and gardens. Industrial suburbs have developed on the plain to the east of the city, where they are close to the main railways and goods yards. Another modern industrial area has spread south-eastwards along the coast beyond S. Giovanni a Teduccio. The new northern districts are mainly residential. The old and most central part of the city contains the shopping areas and commercial houses, whilst near the harbour there are very bad slums. The Stock Exchange and University are on the Corso Umberto I, which divides the old city from the harbour slum area.

The modern city now includes in its commune the towns and villages of Posillipo, Fuorigrotta, Bagnoli, Soccavo, and Pianura to the west, S. Giovanni a Teduccio, Barra, and Ponticelli to the east, and S. Pietro a Patierno, Secondigliano, Chiaiano, and Uniti to the north. The coastal towns of Baia, Pozzuoli, and Bagnoli, west of Naples, are now, in effect, industrial suburbs of the city.

History

The origin of Naples is largely a matter of conjecture, but its name, Neapolis, denotes a new city, and it was probably founded by Greek colonists not later than the sixth century, near an existing settlement known as Parthenope or Paleopolis. In 327 B.C. the Romans attacked Naples and forced it into an alliance, which carried with it the obligation to contribute ships and men to Rome. From an ally Naples sank to the position of a Roman municipium, and under the Empire became a colony. Nevertheless, the city preserved its Greek civilization, and its fame as a place of learning, together with the attractions of its climate, made it a favourite resort of the Romans. Here Virgil wrote his *Georgics*, and Marcus Aurelius came to study. Statius was a native of the city and Horace and Martial sang its praises. Emperors and wealthy Roman citizens had villas there, among the most famous being that of Lucullus, on the island of Megaris, which later became the fortress of Castel dell' Ovo, and in which the deposed Emperor Romulus Augustulus spent his last days (A.D. 476).

Occupied by the Goths, Naples was besieged by both Belisarius and Narses, and in 555 was brought definitely under Byzantine rule.

It was strongly fortified and became a centre of Byzantine civilization and a place of refuge from the Lombards. Perhaps its most flourishing period was from 763 to 1139, when it had thrown off the Byzantine yoke and its government was presided over by native dukes. Schools, churches, libraries, and religious houses were founded, and the city defended itself successfully against Saracen raiders and Norman conquerors. Not until 1139 was it forced to yield to Roger II of Sicily, and even then it enjoyed a large measure of autonomy under a Norman governor. In 1189 Naples supported the cause of Tancred of Lecce against that of the Hohenstaufen, and was punished for so doing by the demolition of its walls. Frederick II showed favour to Naples, founding the university there in 1224, but the citizens revolted and placed themselves under papal protection at his death, and when Charles of Anjou entered the city as a conqueror in 1265 he was enthusiastically received. Three years later Conradin, the last representative of the Hohenstaufen, was executed at his orders in the Piazza del Mercato at Naples. In 1282 Charles was driven from the island of Sicily, and Naples became the capital of the Angevin kingdom. Charles built the Castel Nuovo, making it the centre of a new suburb in which members of his family and wealthy citizens erected palaces. His grandson, Robert the Wise (1309-1343), added yet another castle on the hill of S. Elmo. Boccaccio, who was a member of King Robert's court, described Naples during his reign as 'peaceful, gay, rich and splendid, above all other cities in Italy'. On the death of the last Angevin, Queen Joanna II, in 1435, Alfonso King of Aragon and Sicily claimed Naples, and overcame his Angevin rival after a seven years' struggle, thus reuniting the island and mainland portions of the old Sicilian kingdom. Unlike his Norman and Hohenstaufen predecessors, Alfonso made Naples and not Palermo the capital, whilst his illegitimate son Ferrante and his heirs were Kings of Naples but not of Sicily or Aragon. Thus during the years 1442-1500 the city was prominent as the capital of a purely Italian State and the seat of a brilliant Renaissance court. Among the signs of its increased importance and prosperity was the building of a new and enlarged circle of walls.

In 1495 Charles VIII of France entered Naples to assume the throne after his triumphal progress through Italy. Within a year he was back in France, and the illegitimate line of Aragon was reinstated by means of Spanish aid. Loss of independence came about through the Treaty of Granada (1500), whereby Ferdinand of Spain betrayed his kinsfolk and agreed to partition the kingdom with Louis XII of

France. Naples itself was included in France's share, and Federico, the last of his line, went into exile. The rule of Louis XII lasted until 1503, when Gonsalvo di Cordova, having defeated the French at Cerignola, marched into Naples. Soon the whole kingdom was in Spanish hands, to be ruled as a dependency of Spain until 1707 when it was occupied by the Austrians. In 1734, owing largely to the machinations of Elizabeth Farnese, the clever Italian wife of Philip V of Spain, Naples and Sicily became once more a united and independent kingdom under her son Don Carlos. Under the title of Charles III he established in the Two Sicilies the Bourbon dynasty which lasted until the days of Garibaldi. The building of a palace at Capodimonte, and the foundation of what is now the Museo Nazionale, marked the return of Naples to the status of a capital. During the revolutionary period the city had more than its share of upheavals. In 1799 a French army marched on Naples, the king and court fled to Sicily on a British battleship, and, despite the heroic resistance put up by the Lazzaroni, or armed members of the populace, the victorious French set up the Parthenopian Republic. Liberals and intellectuals in Naples supported the republic, but it was overthrown by the forces of Cardinal Ruffo, sent from Sicily. Ruffo granted honourable terms to the republicans, but the armistice was repudiated by Nelson, at the orders of the king, whom he had brought back from Sicily, and many of the most distinguished Neapolitan citizens were victims of the royal vengeance. In 1806 the French returned, and first Joseph Buonaparte and then Joachim Murat became King of Naples; the latter was responsible for much new work in the capital and is reckoned by the citizens among their most illustrious rulers. The return of the Bourbons in 1815 brought with it a regime of ruthless repression on the one hand and growing aspirations after liberty and national unity on the other. Too late, the last Bourbon king, Francis II, proclaimed a constitution. Garibaldi was already master of Sicily, and on 6 September 1860 the king left Naples for Gaeta only a day before Garibaldi entered the city, made delirious with joy at his coming.

Amid the many vicissitudes of her history Naples has never ceased to be a home of learning and philosophy. Called by the Romans 'ducta Parthenope', the tradition of learning was maintained in the Dark Ages by her native dukes, it was continued in the thirteenth century when St. Thomas Aquinas taught in the newly founded university, and again in the fourteenth and fifteenth centuries by the scholars and poets who frequented the courts of Robert of Anjou

and Alfonso of Aragon. From the sixteenth century onwards Naples has produced a succession of philosophers, beginning with such pioneers of modern thought as Telesio, Giordano Bruno, and Campanella, and culminating in Benedetto Croce, the idealist philosopher of the present age. This is the more remarkable in view of the common conception of Naples as a city of song and laughter, with a populace noted for their ignorance and idleness. Such contrasts, however, are characteristic of Naples, which has known throughout the centuries the extremes of wealth and poverty. In the past it has been a city of palaces and hovels; to-day, side by side with broad streets and modern buildings, the narrow alleys and dark archways of medieval Naples are still to be seen.

Public Buildings and Monuments

First in importance among Neapolitan monuments is the Museo Nazionale, one of the largest and most interesting museums of antiquities in the world. It owes its origin to the first Bourbon king, Charles III (1734-1759), who initiated systematic excavations at Pompeii and Herculaneum, the two cities buried by the eruption of Vesuvius in A.D. 79, and built a museum at Capodimonte to house the finds, together with the rich Farnese collection of works of art, which he inherited from his mother. Before the end of the century the exhibits had outgrown their home, and the present building, which had hitherto been used as the university, was adapted to receive them. The bronzes and wall-paintings from the buried cities and the Pompeian mosaics are of unique importance; hardly less remarkable are the Greek sculptures, and Roman copies of Greek originals, collected from many sources. The Pinacoteca on the first floor consists mainly of paintings and tapestries from the Farnese collection. In the Villa Nazionale, or public garden, close to the shore, is the famous Aquarium, containing more than 200 animal and vegetable species from the bay, kept alive by waters conveyed direct from the sea. The cathedral of S. Gennaro was begun in 1294, on the site of an earlier building, but has been many times restored. The chapel of St. Januarius, or Tesoro, is enclosed by an immense grille of gilded bronze by Fansago, and has frescoes by Domenichino. In a tabernacle over the altar is preserved the head and two phials of the blood of the saint, who was martyred at Pozzuoli in 305. According to tradition, when the body of St. Januarius was brought to Naples in the fifth century a liquefaction of the congealed blood took place; the miracle repeats itself twice yearly in May and

September, occasions of great moment in the life of the city. The saint's body first lay in the Catacomb of S. Gennaro, on the northern slopes of the city; in 1497 it was transferred to the newly built crypt of the cathedral, an elegant Renaissance structure by Malvito of Como. The basilica of Sta. Restituta, founded in the fourth century on the site of a temple of Apollo, is now joined to the cathedral; its ancient baptistery is the earliest example of its kind in Italy. The numerous churches of Naples illustrate the various stages of its historical and architectural development. Noteworthy among them are S. Lorenzo, a Franciscan church of the late thirteenth century with an eighteenth-century façade; Sta. Chiara, consecrated in 1340, but rebuilt in the baroque style, containing the colossal tomb of Robert the Wise (d. 1343) by Florentine sculptors; Monte Oliveto, begun in 1411, and of special interest owing to its wealth of Renaissance sculpture; the Certosa of S. Martino, founded in 1325 but transformed by Fanzago (1591-1678) and representing the fullest expression of the baroque style, in which Neapolitan architecture shows genuine individuality. The island fortress of Castel dell' Ovo, dating from the twelfth century and embodying columns from the villa of Lucullus, is of great historic interest. Castel Capuano was built by the Normans and formed the residence of both Hohenstaufen and Angevin monarchs. The beautiful Renaissance Porta Capuana, flanked by two massive Aragonese towers known as Honour and Virtue, was built when a new circle of walls was made under King Ferrante (1458-1494). Castel Nuovo, built by French architects for Charles of Anjou (1279-1282), and surrounded with bastions by the Spaniards, contains the famous triumphal arch erected to commemorate the entry of Alfonso I into Naples in 1443; it is one of the glories of the Renaissance. The Palazzo Reale, built by Fontana in 1600-1602, has statues representing the eight dynasties of Naples, Roger the Norman, Frederick II of Hohenstaufen, Charles I of Anjou, Alfonso of Aragon, the Emperor Charles V (Habsburg), Charles III of Bourbon, Joachim Murat, and Victor Emmanuel II of Savoy. The Teatro S. Carlo, founded in 1737, is one of the largest in the world and a famous shrine of music. In the Galleria Umberto I (1887-1890) some of the best shops and cafés are to be found. The present university buildings date from 1908.

Industry

Naples, the principal industrial and commercial centre of southern Italy, is notable for the variety of its industries and is also an important

agricultural market. The industries are mainly based on local agricultural products from the very fertile country round about, and raw materials imported through its great port. The principal industries are metallurgy, engineering, food processing, fishing, and the manufacture of fancy goods for the tourist traffic.

Naples has a large metallurgical and engineering industry. The Ilva iron and steel works at Bagnoli are one of the three biggest in Italy, besides being the most important in southern Italy. Its total annual capacity is about 250,000 tons each of pig-iron and steel, whilst about 200,000 tons of coke are produced a year, as well as other by-products of coal, such as ammonium sulphate and crude benzol. The plant, which employed about 1,000 workers in 1938, has its own pier (p. 293). In addition there are other much smaller iron and steel works, besides foundries for copper, brass, and lead. Shipbuilding is one of the most important branches of the engineering industry (p. 286). The major shipbuilding facilities have been combined under Navalmeccanica, which includes the former S.A. Bacini e Scali, the Pattison shipyard, and the Pattison engineering works. Vessels up to 10,000 tons were constructed before the outbreak of war, when the largest yard employed about 1,200 workers. Another firm between Baia and Pozzuoli can build ships up to 2,000 tons. The manufacture of aircraft and their component parts is also notable. By far the largest firm is the Industrie Meccaniche Aeronautiche Meridionale, a subsidiary of Breda. Production and the number of employees fluctuate considerably.

Guns, torpedoes, and ammunition are made by the Royal Arsenal, which employs about 1,500 workers in peace-time, and by the arms depot of the Tenth Heavy Artillery Regiment, which employs about 1,200. One of the largest armament works in the Naples district is Ansaldo's branch at Pozzuoli, where 1,500–2,000 workers were employed in 1938. The torpedo factory of S.A. Silurificio, which has recently been moved from Naples to Pozzuoli, is one of the three largest factories of its kind in Italy and before the outbreak of war accounted for about 20 per cent. of Italian production. Other local firms make components for torpedoes.

Of the remaining engineering works the most notable include the Breda locomotive works and the State Railway workshops, which undertake large-scale rolling-stock and locomotive repairs, whilst two firms make tin cans and other types of containers. Amongst other engineering products are large marine engines, boilers, turbines, lifts, precision instruments, air compressors, electric cable and wire,

electric motors, agricultural machinery, and machinery for the food-processing industries.

The food-processing industry is important. The milling of flour and the manufacture of pasta is mainly for local consumption, though some pasta is exported. There are numerous pasta factories, and flour mills, several of which are large. The canning of locally produced fruit and vegetables, particularly tomatoes, is outstanding, and the products are exported all over the world. The Cirio canning factory in S. Giovanni a Teduccio is one of the largest in Italy. Fruit is also made into jam and preserved in syrups. The greater part of the edible oils produced in Naples are consumed locally. The most important vegetable and seed oil refinery is that of the Oleificio Liguri Napoletano. In the city itself there are at least 2 sugar refineries, chocolate and confectionery factories, about 30 wine-making establishments, and several tobacco factories.

The Montecatini combine has chemical factories at Bagnoli and Portici, where sulphuric acid, copper sulphate, and phosphatic fertilizers are the main products. In Naples itself the principal chemical industry is the electrolytic manufacture of caustic soda and chlorine which is undertaken by three firms, probably in conjunction with each other. Ugo Cattania manufactures synthetic resins, S.A. Fabbriche Fiammiferi ed Affinii makes matches, glycerine, and soap, and the S.A. Mira Lanza household and industrial soap and glycerine. Other lesser firms also make soap and glycerine. There is a very important oil refinery at the port (Appendix I).

The textile industry is varied and includes a cotton mill with 300,000 spindles and 3,891 looms, and the third largest rayon mill in Italy which belongs to a subsidiary of Cisa and employs 1,000 workers. There are as well a large jute spinning and weaving mill and hemp mills. The making of leather gloves is the outstanding branch of the clothing industry, whilst there are a number of small tanneries.

Quarrying is an important industry in the neighbourhood of Naples. Outstanding is the extraction of pozzolana, a natural cement basis which is very useful for marine construction. Of the six cement-making plants in the vicinity of Naples the Ilva cement works at Bagnoli is the largest. It, however, mainly uses the waste from the Ilva blast furnaces, and has an estimated capacity of 100,000 tons. Around Vesuvius there is considerable quarrying of volcanic rock.

Fancy articles in lava, wood, coral, and tortoiseshell as well as

embroidery are made throughout Naples and round the shores of the gulf for the tourist trade and for export. Amongst other miscellaneous products are china, pottery, glass, electric insulators, artificial flowers, cork and rubber goods, paper, perfumes, and musical instruments.

Description of Port

Naples, the second largest port of Italy, is a port of call for shipping lines to all parts of the world and has a very considerable passenger traffic in addition to its vast commercial trade. It is a centre for a host of local shipping lines, as well as for air transport, and is well connected inland by road and rail.

The approaches are clear, and there is good anchorage, safe in all but southerly winds, south-west of the harbour proper on either side of the island of Castel dell' Ovo.

The harbour, whose quays extend in a curve for more than $2\frac{1}{2}$ miles, is entirely artificial and is protected by a mole and two detached breakwaters. In the south-west the Molo San Vincenzo (1) stretches in two slightly off-set sections east-south-east for 1,600 yards from the shore south of the Castel Nuovo. Overlapping its head and roughly parallel to it is a short detached breakwater, 360 yards long, the Diga Duca degli Abruzzi, giving added protection. Some 500 yards to their north-east is the second breakwater, also detached, the Antemurale Thaon de Revel (2). This is gently curved and about 500 yards long, and lies south-west and north-east at right angles to the Diga Foranea Emanuele Filiberto Duca d'Aosta (3), which is 1,500 yards long, slightly dog-legged and parallel to and some 600 yards from the shore. Both these last are quayed on the inside and are used by vessels, berthed stern-to, waiting or lying up.

The principal entrance, the Bocca di Ponente, is between the two breakwaters opening south-east. The fairway is 1,020 feet wide with depths of 100 feet or more. and leads to the Avamporto Regina Elena or Outer Harbour, a manœuvring area with depths of 48 to 84 feet. To its east and inside the Diga d'Aosta is the Bacino Vittorio Emanuele III. Although there is easy access between the two, vessels using this latter basin normally approach from and leave through the Avamporto di Levante and the Bocca di Levante at its eastern end. This entrance is 900 feet wide between the breakwater and the Pontile Vigliena, and has depths of 24 to 48 feet.

The Avamporto Regina Elena and the Bacino Vittorio Emanuele III are encircled along the shore by a series of quayed basins

separated by piers. From south-west to east they are as follows: immediately inside the Molo San Vincenzo is the Bacino del Littorio, the Naval Port, with naval establishments occupying the root of the mole, while the Molo Luigi Razza, with the new Stazione Marittima, forms its northern side. To its north is the Bacino Principe di Piemonte, the old Commercial Port, whose quays are broken by a broad mole and two piers, and whose east side is protected by the Molo del Carmine and its transverse extension, the Molo Martello. The Darsena dei Bacini (5) and its dry-docks are between this mole and the Molo Cesario Console, off the southern end of which a new dry-dock is being constructed. The Darsena Armando Diaz (6) lies next, due north of the Bocca di Ponente, its north-western corner still unquayed and its entrance narrowed by the new dry-dock and by the western end of a transverse jetty at the head of the pier to its east, the Pontile Emanuele II. To the east of this pier are the three basins of the Bacino Vittorio Emanuele III, the Darsene Vittorio Veneto (7), Granili (8), and Pollena (9), separated by the Pontili Duchesa Elena d'Aosta and Giovanni Bausan and bounded on the east by the Pontile Vigliena, which is the oiling pier. The shore of the Avamporto di Levante (10) is at present only partially developed. The detached harbour work protecting the frontage of the electric power station is along the presumed line of the future quay and will form part of it.

The harbour is thus simple in layout and all parts are readily accessible. It is very well equipped and practically all machinery is electrified, while it is well served by road and rail. The quays are between $6\frac{1}{2}$ and $7\frac{1}{2}$ feet high with vertical sides.

Heavy and widespread damage was sustained from aerial bombing in 1943 and 1944.

Facilities. The Bacino Principe di Piemonte houses most of the port offices. The Captain of the Port's office is on the Molo Piscane, the Health office is on the Pontile Immacolatella Vecchia, and the custom house is on the far side of the Via del Piliero behind the Calata Costanzo Ciano.¹ There is now, however, a new customs-house on the Calata Vittorio Veneto.

The peace-time complement of harbour craft included 5 or 6 privately owned tugs, 2 of which were equipped for salvage, and 11 passenger ferry boats. There were also water-boats and oilers, numerous trawlers and drifters, and several hundred lighters and barges.

¹ Formerly the Calata Piliero.

Cranes numbered about 60 and they were well distributed eastwards from the Calata Italo Balbo.¹ Their capacity was between 1 and 5 tons. The majority were travelling portal or semi-portal cranes with either luffing or fixed jibs, but there were travelling gantries for handling coal on the Pontile Giovanni Bausan. The floating equipment consisted of 2 floating cranes, 1 of 40 tons and the other of 10 tons capacity, and 11 sheerlegs, of which one was large.

Warehouses were plentiful, the main concentrations being behind the Calata Italo Balbo and Villa del Popolo, and on the Pontile Emanuele II. There was one along the whole length of the west quay of the Molo del Carmine, and east of the root of the Pontile Vigliena there was the large 'Cirio' store. Among those behind the Calata Villa del Popolo were a cold store and a grain silo with a capacity of 45,000 tons.

Supplies of coal are handled and stocks maintained on the Pontile Giovanni Bausan, where there were 4 travelling transporters with swivel cranes with grabs. Ships are supplied by lighter. The oil quay is the Pontile Vigliena. Tankers berth at the head where there are 4 discharge points or on the west quay where there are 2 discharge points, and pipe-lines lead inland to the large storage installations and the refinery mentioned in Appendix II. Ships are normally supplied by oilers.

There are hydrants on all quays and water-boats are among the normal harbour craft. The port is well lit by electricity.

The shipyards and repair shops were well designed and adequately equipped to execute all repairs. They have now been combined under one authority, the 'Navalmeccanica' (Società Anonima Stabilimenti Navali e Meccanici Napoletani). Apart from the naval port, where there is a dry-dock and repair shops for servicing submarines, repair facilities are centred in the Darsena dei Bacini and on the Calata Vigliena. In the former there are 2 graving docks, 2 building slips, a marine railway with a lift of 1,000 tons, and extensive repair shops. Off the head of its eastern mole and outside the basin is the new dry dock, not yet complete, which is to be able to take vessels up to 35,000 tons. The old Pattison shipyard behind the Calata Vigliena has recently been extensively altered: the old building slips have been demolished and two new berths of a semi-movable type constructed, capable of handling ships of 10,000 tons. Submarine and aircraft repair shops have been erected.

¹ Formerly the Calata Porta di Massa.

Details of Dry Docks and Slipways

	Length on bottom		Width of entrance		Depth over sill	
	ft.	in.	ft.	in.	ft.	in.
Naval Dock	240	10	62	4	21	4
Darsena dei Bacini						
Dock No. 1	664	6	94	9	33	9
Dock No. 2	371	1	59	6	24	4
New dock	1,053	0	131	0	43	6
Slipway No. 1	335 ft. long × 50 ft. wide					
Slipway No. 2	310 ft. long × 40 ft. wide					

In addition to the facilities in these three main yards, there are 2 building slips in the north-western unquayed portion of the Darsena Armando Diaz, and 3 or 4 building slips, the largest about 200 feet long, east of the root of the Pontile Vigliena. A floating-dock measuring 400 feet by 80 feet, and used mainly for submarines, was normally berthed in the Darsena Pollena.

These port repair facilities are supplemented by the large marine engineering works behind the Granili barracks and by the many other engineering and metallurgical establishments in the town and its satellites.

The harbour railways are adequate for the traffic, but there is a severe bottleneck in the loop-line connecting to the main station at the point where, behind the Calata della Marinella, it leaves the port area. From this quay lines run to the westernmost part of the harbour and eastwards as far as the Calata Pollena, with tracks along the face of most quays and on to all piers except the Pontile Immacolatella Vecchia. There are marshalling yards between the warehouses backing the Calata Italo Balbo in the western section, and dead-end sidings behind the root of the Pontile Giovanni Bausan in the eastern section. The new Stazione Marittima is on the Molo Luigi Razza and was built exclusively for passenger traffic: passengers land on to first-floor galleries at deck level, while baggage is handled on the ground floor. Rails are everywhere flush.

A wide road skirts the harbour with frequent branches and easy access to the quays and piers.

Trade and Connexions. Although in volume of trade Naples stands only fourth among Italian ports (after Genoa, Venice, and Savona), it comes first in the number of ships that call.

Statistics of shipping are as follows:

	1938	1939
Ships entered: number . . .	9,492	8,949
tonnage . . .	11,445,000	10,533,000
Ships cleared: number . . .	9,480	8,942
tonnage . . .	11,443,000	10,502,000
Goods landed: tons . . .	1,969,620	2,077,000
Goods loaded: tons . . .	469,624	463,000

In a normal year about 75 per cent. of trade is foreign and 25 per cent. is coastal.

In 1938 the major imports in order were coal and coke, mineral oil, wheat, and foodstuffs, while others of importance were metals, timber, chemical goods, building stone and cement, fibre and textiles, and cellulose. The chief exports were fruit and vegetables, wheat and flour, mineral oil, cement, coal and coke, fibre and textiles, and metals.

The number of passengers disembarked and embarked was respectively 587,458 and 598,525 in 1938, and 613,839 and 615,257 in 1939. These numbers rank next largest after those of Trieste.

Naples is the starting-point for daily services to Palermo and such places as Capri, Amalfi, Forio, and Ischia Porto, while there are sailings twice weekly to Ponza, weekly to Tunis, Cagliari, the Lipari islands and Messina, Malta and Tripoli calling at Sicilian ports, Port Said and Assab, and fortnightly to Benghazi, all with intermediate calls. In addition Naples is a port of call on the many irregular coastal routes between Genoa and Trieste, Genoa and North Africa, Genoa and East Africa, and on the round trips from Genoa to Sicily to Sardinia to Genoa. The following regular services call: fortnightly, from Genoa to Sicily and the Adriatic ports, to Alexandria, Haifa, and Beirut, to the Piraeus, Rhodes, and Alexandria, to the Piraeus, Smyrna, and Istanbul, to Alexandria and the Levant, to Sicily, the Piraeus, Salonika, Istanbul, and the Danube ports, and to Port Said, the Red Sea ports, Mogadishu and Chisimayu; every three weeks, from Genoa to Lisbon and Eastern Canada; monthly, the three services from Genoa to the Far East, from Genoa to Spain and New York, from Trieste to Gibraltar, Dakar, Cape Town, Mombassa, from Genoa to West Africa and the Congo, to the Gulf of Mexico, to Brazil and Argentina, and to Genoa, Trinidad, Panama, and Vancouver; and the Genoa-Colombo-Australia service six times a year.

Intermediate stops are not given, and in many cases overlapping ensures a more frequent service than that stated.

No.	Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
1	Molo San Vincenzo				
	Outer portion .	8-10	c. 3,000	—	Inner side quayed.
	Diga Duca degli Abruzzi	25	1,080	—	Vertical walls: quay on inside protected by outer parapet.
2	Antemurale Thaon de Revel	24½	c. 1,500	—	Slightly curved. Inner side quayed.
3	Diga d'Aosta . .	27½	3,150+ 1,350	—	Dog-legged. Inner side quayed.
	<i>Bacino del Littorio (Naval Port)</i>				
	Molo San Vincenzo .	..	..	..	Naval craft, esp. submarines.
	Inner portion .	10-16	1,000+ 180+130	—	Naval buildings behind. Naval dry dock at east end, beyond which a curved section (c. 550 ft.) joining to outer portion.
	Darsena F. Acton .	..	..	..	Entrance c. 65 ft. wide with depths of 21 ft. South-east side broken by slipway roughly 50 ft. × 50 ft. and the quay to its north-east is continuous with the eastern wall of the entrance canal.
	North-east side .	6-12	250	—	Packet boats. Landing from civil flying boats. At SW. end projection, Pontile dei Cavalli to west side of en- trance canal to Darsena F. Acton.
	North-west side .		250	—	
	South-west side .		350	—	
	South-east side .		200+150	—	
	Calata Beverello .	26	490	—	
	Molo Luigi Razza .	..	..	—	Large passenger ships. Pas- sengers and mail only. Two portions of south side step- ped. Maritime station with raised gallery and mobile gangways for passengers.
	South side .				
	Western portion .	36	640	—	
	Eastern portion .	36	920	—	
	Head .	33-42	400	—	
	<i>Bacino Principe di Piemonte (Commercial Port)</i>				
	Molo Luigi Razza .	..	..	..	Shoal over remains of de- molished mole off centre: being removed in 1942.
	North side .	19-36	1,350	—	Coasters and lighters.
	Calata Costanzo Ciano	c. 30	820	—	Harbour craft and gulf steam- ers. Health office. Jetty projects across end of west side continuous with line of head.
	Pontile Immacolatella Vecchia	..	..	..
	West side .	? 10	220	—	
	Head and jetty .	24	230	—	
	East side .	15-24	190	—	
	Calata Italo Balbo	19-23	1,230	7	Several warehouses behind.
4	Molo Carlo Pisacane .	..	..	..	Passenger ships, especially for Sardinia, Sicily, and Libya.
	South-west side .				South-west side in three steps, each 100 ft. wide.
	North portion .	33	245	—	Port Offices.
	Central portion .	33	260	—	
	South portion .	33	260	—	
	Head .	25	145	—	..
	East side .	19-30	850	—	..
	Calata Villa del Popolo	..	..	..	Grain, meat, and fish. Grain silo and cold store behind.
	West portion .	21	535	3	
	Pontile dei Silos .	26	350	4	Cranes on P. dei Silos are marine legs with bucket ele- vators to conveyor belts; two
	East portion .	21	620	6	

No.	Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
	<i>Bacino Principe di Piemonte (Commercial Port) (contd.)</i>				
	Molo del Carmine . . .	..	..	..	of cranes on east portion are grain elevators.
	West side				South portion, set back 150 ft. from north portion, is used by contractors for harbour works.
	North portion . . .	26-30	1,130	10	
	South portion . . .	? 10	400	—	
	Molo Martello				
	North side . . .	7-10	360+380	—	Lighters and harbour craft lying up.
	South side . . .	? 12	320+450	—	Explosives and inflammable cargoes.
5	<i>Darsena dei Bacini</i>				
	Molo del Carmine				
	East side . . .	4-23	600+450	2	..
	Head of basin . . .	26	c. 850	—	Broken by dry docks and slipways.
	Molo Cesario Console				
	West side . . .	13-26	680+ c. 990	? 1	Southern 990 ft. broken by rectangular projection, and curved at north end.
6	<i>Darsena Amando Diaz</i>				
	Molo Cesario Console				
	East side . . .	23-30	1,200	1	South of quay and SE. of southern tapering extension, new dry dock under construction.
	Calata della Marinella	17-19	920	—	NW. end unquayed. Two building slips.
	Pontile Vittorio Emanuele II				
	West side . . .	26-33	1,250	3	Jetty projecting west 200 ft. at southern end.
	Head . . .	8-14	600	—	Extended by projecting jetties.
7	<i>Darsena Vittorio Veneto</i>				
	Pontile Vittorio Emanuele II				
	East side . . .	27-30	1,150	9	Jetty projecting east 270 ft. at southern end.
	Calata Vittorio Veneto	14-25	670	—	New customs house.
	Pontile Duchessa Elena d'Aosta				
	West side . . .	28-32	810	2	Timber.
	Head . . .	27	330	—	..
8	<i>Darsena Granili</i>				
	Pontile Duchessa Elena d'Aosta				
	East side . . .	31-36	810	3	..
	Calata Granili . . .	33	650	3	..
	Pontile Giovanni Bausan	..	..	..	Coal.
	West side . . .	31-36	810	4	Coal transporters, with swivel cranes and grabs.
	Head . . .	36	330	—	..

No.	Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
9	<i>Darsena Pollena</i> Pontile Giovanni Bau- san				
	East side . .	36	850	4	..
	Calata Pollena . .	28-33	475	—	..
	Calata Vigliena . .	26-30	250+350	—	Broken by shipbuilding basin. Repairs.
	Pontile Vigliena . .	..	..	..	Oiling pier. Pipe lines. Two discharging points on west side and four at head. Small jetty projecting at SE. corner of head.
	West side . .	30	850	—	
	Head . .	36	330	—	
10	<i>Avamporto di Levante</i> Pontile Vigliena				
	East side . .	? 13	c. 850	—	Three or four building slips at root.
	'Cirio' pier . .	..	c. 130	—	Depth of 6 ft. at head.
	Breakwater . .	..	c. 675	—	Detached, c. 200 ft. offshore on line of proposed new quay. Protecting unquayed shore line fronting power station.
	Power-house break- water	..	c. 360	—	Protective breakwater at right angles to shore.
	Cement works pier . .	..	c. 330	—	Depth of 5 ft. at head.

Subsidiary Ports of the Gulf of Naples. In addition to the port of Naples itself there are subsidiary landing places and quays near by in the gulf of Pozzuoli at Baia, Pozzuoli, and Bagnoli, and on the east shore of the bay of Naples at Torre del Greco.

The gulf of Pozzuoli is in the north-west corner of the gulf of Naples and opens southwards between Cape Miseno on the west and the island of Nisida on the east. Round the circumference of the bay there are several piers and moles, and parts of the shore are quayed, but the most important harbours are at Baia, at the Ansaldo armament works a short distance north-west of Pozzuoli, at Pozzuoli itself, and at Bagnoli.

At *Baia* (40° 49' N., 14° 4' E.) the main mole, which is 720 feet long and 485 feet wide, is used chiefly for testing and servicing torpedoes. There are two jetties near its head projecting at right angles from the north side and the shore is quayed north-west to a stub jetty, and for some distance beyond. Depths are slight and vessels berth stern-to. Baia is served by an electric railway from Naples via Pozzuoli. Between Baia and Pozzuoli the Cantieri Arco Felici shipyard has 4 slipways, the largest having a length of 240 feet.

The *Pontile Ansaldo* extends south-south-west for about 900 feet

in front of the Ansaldo works. On it are railway tracks and a 160-ton sheer-legs, while a small rectangular harbour has been formed north-west of its root by a jetty at right angles to the shore and a detached breakwater lying across its mouth.

The harbour of *Pozzuoli* ($40^{\circ} 49' N.$, $14^{\circ} 7' E.$) itself is protected by the Molo Caligoliano, and irregular quays extend northwards from its root for a total distance of about 1,750 feet. A small enclosed basin, the Darsena dei Pescatori, lies just south-east of the root of the mole and is reached by a narrow passage under the bridge connecting the mole to the shore. (Plate 26 and Appendix III).

Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
<i>Ansaldo Works</i>				
Pontile Ansaldo . . .	..	..	..	Serves Ansaldo armament works.
South-east side . . .	13	c. 450	4	Also the 160-ton sheer legs.
Head	22-25	c. 250	—	..
North-west side . . .	30	c. 100	—	..
	20	c. 250	—	..
	12	c. 450	—	..
Banchina Ansaldo . . .	6-9	c. 650	—	..
<i>Pozzuoli</i>				
Molo Caligoliano . . .	9-29	c. 275 + 250 + 500	—	..
Darsena dei Pescatori . .	c. 6	c. 200 + 160 + 160 + 275	—	Fishing-boats. Entered in NW. corner under bridge connecting Molo Caligoliano to shore.
Banchina di Santa Maria .	12	c. 180	—	Northern portion set back slightly.
Banchina Emporio . . .	10-13	c. 300	—	Small sailing-vessels. Portions extend respectively east, north, and east.
		c. 170 + 100 + 170	—	
Banchina C. Colombo . .	1½	c. 750	—	Small local craft only.
Banchina Villa . . .				

At *Bagnoli* ($40^{\circ} 48' N.$, $14^{\circ} 10' E.$), in the south-east corner of the bay of Pozzuoli, the island of Nisida has been joined to the mainland by a causeway. The anchorage to its north, off Bagnoli beach, is thus afforded some protection, but is otherwise very exposed. The movement of shipping is restricted when flying exercises are in progress.

The north side of the causeway and the north-east shore of the island are quayed, as is the inner side of the short mole built from the north point of the island to give them additional protection. These quays are used by coasters handling local products, but the



PLATE 26. *Pozzuoli*

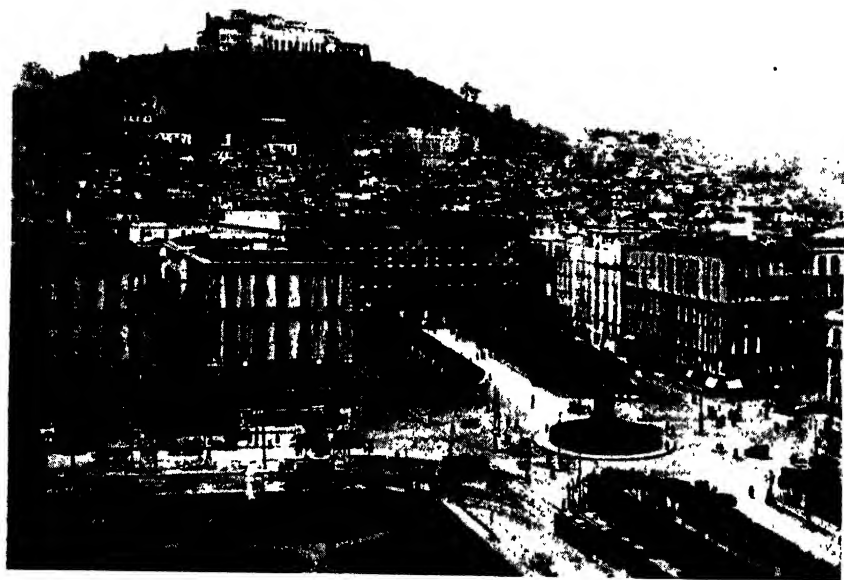


PLATE 27. *Naples: Piazza Municipio and Castello S. Elmo*



PLATE 28. *Western Naples*

main activity of the anchorage is at the four piers about half a mile farther north. The most southerly, Pontile Montecatini, is mainly used by local passenger boats, for Bagnoli is a tourist and holiday resort. The others serve the important Ilva steel works along the shore behind them. Just north of the passenger pier is a short pier about 170 feet long, apparently without facilities. Some 500 feet north of the passenger pier is the Pontile Ilva, and approximately 600 feet farther north again is a new broad-headed pier. This is slightly longer than the others and has on it four travelling gantries for handling ore and coal, and railway tracks.

Off the south end of the Ilva works, midway between the Pontile Montecatini and the causeway, a breakwater has recently been built, about 420 feet long parallel to and distant some 100 feet from the shore. The area inside it is being reclaimed.

There are no facilities on the Nisida quays, unless it be the warehouses mentioned in some reports. The Pontile Ilva and the new pier have cranes and railway lines for handling ore, coal, and coke to the works, and these lines connect with the railway from Naples.

<i>Name</i>	<i>Depth alongside (feet)</i>	<i>Length (feet)</i>	<i>Facilities, &c.</i>
West mole . . .	9-30	c. 500	In four sections.
Nisida quay . . .	9-15	900+180	Eastern section facing east at right angles to causeway.
Causeway . . .	..	..	Several buildings, especially at outer end and on central bulge which divides causeway into two. North side only faced.
Western portion . . .	c. 12	c. 1,100	
Eastern portion . . .	4-12	c. 520	
Pontile Montecatini . . .	6-12	750	Passenger traffic. Wide head (50 ft.), inner portion only a footbridge.
Pontile Ilva . . .	9-24	1,350	Serves steel works at root. 7 cranes, hoppers, and cargo shutes. 3 rail tracks.
New pier . . .	..	c. 1,800	Outer 475 feet of head widened. 4 (?) gantries and rail tracks connecting to north and east of works.

The small artificial harbour of *Torre del Greco* (40° 47' N., 14° 22' E.) is about 7 miles south-east of Naples. It is formed by a single mole, which curves south-south-east for approximately 1,425 feet from the north-west of the town. The area so enclosed can accommodate four or five ships drawing not more than 16 feet, but is exposed to southerly winds. A small pier extends a short distance from the east shore in the north-east of the harbour. The inside of the mole is quayed, but depths are only from 3 to 15 feet and there

are no handling facilities. There is a silo at its root. Water is available, and minor repairs can be executed.

Inland Communications

Railways. The Naples Central Station, including the low-level Piazza Garibaldi station, is the starting-point for the following: (1) A double-track electrified line to Rome (direttissima) via Pozzuoli and Formia, or alternatively via Aversa, joining the above at Villa Literno. (2) A double-track line to Rome via Caserta and Cassino. At Cancello single-track lines diverge for Benevento via S. Severino Rota and for Torre Annunziata via Ottaviano, while a single-track narrow-gauge electric line goes to Benevento via the Caudine Forks. (3) A double-track electrified line to Battipaglia, where the single-track line to Brindisi branches off the single-track electrified line to Reggio di Calabria. (4) A single-track electrified line to Benevento and Foggia which crosses line 2 at Caserta. From the Corso Garibaldi station narrow-gauge private railways leave for Bairo, Sarno, and Castellammare di Stabia and Gragnano. The Piazza Carlo III station is the terminus of the narrow gauge electrified line to Piedimonte d'Alife via Aversa, and the Montesanto station for the private electric line to Torregaveta, the starting point for steamers to Ischia. The funicular railway up Vesuvius is reached from Pugliano, a station on the line from the Corso Garibaldi station to Castellammare di Stabia.

Tramways. Electric trams serve the city. There are funicular railways to the Vomero from Piazza Montesanto and Parco Margherita and a funicular also ascends Monte di Posilippo. There are tramways from Naples to Aversa and Albanova; Afragola and Caivano; Capodichino and Frattamaggiore; Giugliano; Marano and Mugnano; Portici, Pugliano and Torre del Greco; Poggioreale; Pozzuoli; Piscinola and Secondigliano via Capodimonte; and S. Giorgio a Cremano.

Roads. An autostrada from Naples to Pompeii is in process of extension to Salerno. Road 7-bis from Capua to Avellino passes through Naples. Road 18 goes to Reggio di Calabria, and road 87 to Caserta, Campobasso, and Termoli. Other main roads lead to Pozzuoli and Bacoli, to Villa Literno and Cascano, to Arienzo for road 7 to Benevento, and round Vesuvius past Ottaviano to Torre Annunziata.

Airways. In 1939 services were operated from the Capodichino airfield, 2 miles north-north-east of the city, to Rome, Palermo, Catania, Syracuse, Malta, Tunis, and Tripoli. There are two seaplane

stations at the eastern end of the harbour and another on the north-east shore of Nisida island off the east shore of the gulf of Pozzuoli. A seaplane service formerly operated between Rome and Naples. Capodichino airfield was a calling place for French and Dutch air lines to the East.

TORRE ANNUNZIATA. Latitude $40^{\circ} 45'$ N. Longitude $14^{\circ} 26'$ E.
Population 38,606.

Position and Site

Torre Annunziata is on the eastern shore of the gulf of Naples where on the west the southern slopes of Vesuvius come down to the sea but give way on the east to the plain of Sarno. The low rugged coast on the west is formed by lava-flows from the volcano, whilst the sandy shore edging the plain of Sarno curves gently south-south-eastwards. The western part of the town is built on a slope, which reaches about 150 feet in the northern outskirts and is pitted with quarries, whilst the eastern part is on the more level ground of the plain. Torre Annunziata is an important route centre as it guards the place where routes from Naples, 13 miles away, debouch on to the open plain after having followed the constricted lowland between the gulf of Naples and the foot of Vesuvius.

History

Torre Annunziata is without historic interest. It grew up in 1319 round a chapel of the Annunciation and a tower built to guard it; its prosperity dates from the foundation of the arsenal by Charles III in 1758. The town narrowly escaped destruction in the eruption of 1906, when the flood of lava came within 20 yards of the cemetery.

Public Buildings and Monuments

The Church of the Annunziata contains a much repainted fifteenth-century altar-piece of the Annunciation. The principal buildings are the Fabbrica d'Armi (arsenal), and several bathing establishments. The town is within 2 miles of the ruins of Pompeii.

Industry

Torre Annunziata is the most important Italian centre for the manufacture of pasta, and about 100,000 tons of flour are milled annually to supply the necessary flour. The Giuseppe Gentile flour-mill is one of the largest in southern Italy. Ilva have a branch

foundry here with an annual production of 50,000 tons, whilst there is a government arsenal which normally makes shell-fuses and explosives and employs 600 workers in peace-time.

Description of Port

The harbour, which is artificial, opens south-east and is formed by a western mole, 2,450 feet long, in three legs, and a broad mole, the Molo di Carbone, projecting 800 feet at right angles to the shore opposite the end of the western mole. The entrance is 1,050 feet wide with least depths of 21 feet in the fairway. The approach from the south-west is clear.

The inside of the western mole is quayed and ships berth stern to. From its root the north shore of the harbour is quayed in a curve 1,050 feet long. At the eastern end of this curved quay is a small hauling-up ramp about 30 feet wide. From the ramp the Calata Crocelle extends south-east for 1,000 feet to the root of the Molo di Carbone. Outside the harbour, 1,100 yards south-east of this mole, a narrow pier about 900 feet long serves the Ilva steel works near its root.

The Port offices are behind the curved northern quay, while the customs-house is at the north-west end of the Calata Crocelle. For loading and unloading large vessels use lighters, which are numerous. There are cranes on the east quays. The Calata Crocelle has at least five warehouses, while there is a small warehouse on the Molo di Carbone, where, as its name suggests, supplies of coal are handled and stocks maintained. Both are connected by the sidings on them to the main Naples-Salerno line. Clearance by road is easy except from the western mole. Once a week one of the ships on the Genoa-Sicily round trip makes a call.

<i>Name</i>	<i>Depth alongside (feet)</i>	<i>Length (feet)</i>	<i>Facilities, &c.</i>
Western mole . .	..	..	Berthing stern-to; submarine projection of 5½ ft. at 6½ ft. depth.
Southern leg . .	19-30	c. 670	..
Middle leg . .	9-25	c. 1,100	..
Northern leg . .	7-13	c. 610	Sailing-vessels career at northern end.
North quay . .	4-10	c. 1,050	Curved. Hauling-up ramp at east end. Port offices in rear. Small craft only.
Calata Crocelle . .	10-16	1,000	Customs-house at north-west end. Stern-to berthing. Grain. Rail tracks behind warehouses. Possibly 5 cranes.
Molo di Carbone . .	6½-14	800	Coal. Railway sidings. 3 cranes.

Inland Communications

Railways. There are two State Railway stations, Torre Annunziata Centrale, a junction $1\frac{1}{4}$ miles to the east, and Torre Annunziata Città, in the centre of the town. Both stations are on the Naples to Battipaglia double-track electrified line. The Central station is the junction for the single-track electric branch to Castellammare di Stabia and Gragnano and for the single-track line to Cancellò. Torre Annunziata is also the junction on the narrow-gauge electric line of the Strade Ferrate Secondarie Meridionali from Naples to Castellammare di Stabia for the branch to Pompeii and Poggiomarino.

Roads. Torre Annunziata is on the autostrada from Naples to Pompeii and also on road 18 from Naples to Salerno. Main roads also lead to Naples round the north side of Vesuvius and to Castellammare di Stabia and Sorrento.

CASTELLAMMARE DI STABIA. Latitude $40^{\circ} 41' N$. Longitude $14^{\circ} 28' E$.
Population 36,439. Seat of bishopric. British Vice-Consul.

Position and Site

Castellammare di Stabia is built in a narrow belt along the coast of the gulf of Naples in the angle between its eastern and south-eastern shores. The eastern shore here is beach-fringed and backed by the southern extremity of the fertile plain of Sarno, whilst the south-western shore, which is rocky or cliffed, rises west of the town to the mountains of the Sorrentine peninsula (I, Plate 19). The greater part of Castellammare is built on the edge of the plain of Sarno. Some of the southern and western parts of the town and the villages of Botteghele, Scanzano, and Mezzapietra, however, spread up the lower slopes of rugged M. Fauto and M. Pendolo, which form the northern section of the mountains of the Sorrentine peninsula and rise to heights of 3,625 feet and 2,001 feet respectively about 2 miles inland. The industrial suburbs have spread along the coast on either side of the town, but for the most part to the north, where the land is more open. Castellammare guards the routes serving the south-western tip of the Sorrentine peninsula, though it is some distance from the main routes serving the west coast of Italy.

History

The ancient Stabiae, situated north-east of the modern town, was overwhelmed by the eruption of Vesuvius in A.D. 79, the elder Pliny being among the victims. It rose again owing to the fame of its

mineral waters, which led wealthy Romans to build villas there, and owing to the road built by the Emperor Hadrian (121-2) connecting it with Nocera. The modern town grew up round the castle of *Castrum de Stabiis ad Mare* which was built by Frederick II and strengthened by Charles of Anjou. It suffered the common fate of fortresses in the Neapolitan kingdom, being besieged and sacked in turn by Angevins and Aragonese, French and Spaniards. In 1541 Charles V bestowed it on Ottaviano Farnese as the dowry of his daughter Margaret and soon after it was plundered by the Corsair Dragut. The city prospered under the patronage of the Bourbon kings, Charles III initiating excavations on the Roman site, and his son Ferdinand founding the shipbuilding yard, which, since 1860, has become of considerable importance.

Public Buildings and Monuments

The most important building is the *Cantiere*, or naval arsenal, founded in 1783, and the source of much pioneer work in shipbuilding. The cathedral, founded in 1587, was restored in 1875; in the chapter-house there is a small museum of local antiquities. The *Municipio* was formerly the palace of the Farnesi. The *Castello*, with its round towers added by Charles of Anjou, is a picturesque feature. On a hill overlooking the town is the *Villa Quisiana*, built by King Robert of Naples in 1310 and a favourite residence of the Angevins; it is now a hotel.

Industry

Castellamare di Stabia has an important engineering industry mainly connected with shipbuilding. The S.A. *Navalmeccanica* has a shipbuilding yard, formerly the Royal Naval dockyard, which now employs about 1,500 workers mainly in the construction of naval and merchant vessels up to 5,000 tons, whilst the *Consorzio Co-operativo per Costruzioni Navali* also builds cargo vessels up to 7,000 tons. A subsidiary of *Caproni* manufactures air-frames and normally employs 800-900 workers. There are also firms making railway wagons, tin-plate, and bolts and nuts. The food industry is not very notable, though *Cirio* have a canning factory. There are also tanneries and a mill for cotton piece goods.

Description of Port

The harbour, facing north and north-west and exposed to all weathers, is divided by a long irregular mole into a naval port to its

west and a commercial port to its east. Access to either is easy, but owing to restricted space the size of vessels is limited. There is good anchorage in most seasons off the head of the central mole.

The commercial port is bounded on the west by the central mole, the Molo di Ponente. Built in four lengths, this mole is quayed on the eastern side and its head is about 2,000 feet from the shore. At its root is a shipyard with five slipways. Thence quays extend east and north-east for nearly three-quarters of a mile, backed by workshops and sheds, and broken by a grain pier, the Pontile dei Silos, and two moles, the Molo di Levante (Sottoflutto), and the Moletto Quartuccio, all at right angles to the shore. The last named forms the north-eastern boundary of the harbour, and between it and the Molo di Levante is a small boat-harbour, with a landing-stage for excursion boats, protected by a rough breakwater which extends in two parts from the middle of the Molo di Levante parallel to the shore. Quays are about 2 ft. 9 in. above high water, and berthing is stern-to everywhere except along the Pontile dei Silos. Lighters are normally used for discharging and loading.

The quays of the naval port also face generally north-west, although two projections at right angles to the shore give short lengths of quays facing north-east. The first of these is quite short and is just west of the root of the Molo di Ponente, while the other, much longer, is about a quarter of a mile farther west and forms the western boundary of the harbour. The quays are backed by the Navalmeccanica machine shops at the head of the shipyard already referred to, and by the well-known government rope-walk.

On the shoal off the southern end of the outer leg of the Molo di Ponente a double landing-stage is being constructed.

Facilities. The port offices are behind the quay east of the Pontile dei Silos.

The shipyard is well equipped with cranes, &c. In addition the Pontile dei Silos has four electric aspirators for grain and salt, each with a discharge of 50 tons per hour. The silos at the root of the Pontile dei Silos belong to the Magazzini Generali and have a capacity of 20,000 tons of grain and 5,000 tons of salt. There are few other warehouses. A limited quantity of coal is normally stored, and there are reported to be two oil tanks in the shipyard. Water is abundant, although details of the hydrants are not known. Lighting is electric and the facilities are probably powered electrically.

The slipways in the south-west corner of the commercial port vary in length from about 300 feet to about 700 feet. One of them is

a patent slip. Almost any repair could be executed in the shops, and there are also several engineering firms in the town.

The standard-gauge line to Castellammare di Stabia serves both the naval and the commercial ports and has sidings in the shipyard and behind the quays of the latter. The commercial port is open to the main road eastwards, but the exits are narrowed by the sheds and other buildings: the quays of the naval port are blocked from this coastal road by the rope-walk, the shops, and the shipyard.

Trade. The principal imports are wheat, coal, mineral oil, timber, semolina, cheese, sardines, sulphur, and phosphates, while the main exports include oranges, olives, potatoes, railway rolling-stock, barrel staves, and wine.

<i>Name</i>	<i>Depth alongside (feet)</i>	<i>Length (feet)</i>	<i>Facilities, &c.</i>
Commercial Harbour			
Molo di Ponente			
Outer leg . . .	42-54	c. 510	{ Landing-stage under construction on shoal east of point of junction.
North central leg . .	25-54	c. 530	
South central leg . .	7-25	c. 230	Curved. Shipyard at south end.
South quay . . .	18	c. 360	
Banchina di Via Duilio .	13-18	c. 765	..
Banchina dei Silos			..
Western length . . .	12-15	c. 450	Four electric aspirators, and belt conveyor to silos at root.
Pontile dei Silos . . .	18-25	c. 420	
Banchina dei Silos			
Central length . . .	7-10	c. 450	Port offices behind south-west end.
Eastern length . . .	9-10	c. 620	..
Molo di Levante . . .			Much of the mole is unquayed.
Western quay . . .	10-16	c. 300	At middle of east side rubble break- water at right angles to mole.
Eastern quay . . .	3	c. 120	Landing stage in centre. Rubble of Moletto Quartuccio at north-east end.
Banchina del Mare Morto	7-12	c. 350	
Naval Harbour			
East quay			
South-east length . .	4	c. 120	Hemmed in by buildings. Two lengths at right angles to each other, facing respectively north-west and north-east.
South-west length . .	4	c. 120	
South quay			
Eastern length . . .	10-12	c. 375	..
Central length . . .	9-10	c. 270	..
Western length . . .	9-15 ^A	c. 570	..
West mole . . .	4-12	c. 570	West side completely silted up.

Inland Communications

Railways. Castellammare is on the double-track electric line from Torre Annunziata Centrale, and is the junction for the single-track

electric line to Gragnano. It is also served by the single-track narrow-gauge electric line of the Strade Ferrate Secondarie Meridionali from Naples. An electric tramway connects Castellammare with Sorrento.

Roads. From Castellammare main roads lead to Torre Annunziata and Sorrento, and secondary roads to Amalfi and Nocera.

Seaplane Base. There is a seaplane anchorage just west of the town.

SALERNO. Latitude 40° 40' N. Longitude 14° 45' E. Population 41,925. Provincial capital. Seat of archbishopric. Chamber of Commerce.

Position and Site

Salerno, at the head of the gulf of Salerno, is about 1½ miles east of the Cava gap, which separates the mountains of the Sorrentine peninsula from the Campanian Apennines. Salerno is in an important strategic position as the Irno valley, which forms part of another routeway through the Apennines to the plain of Sarno and Naples, also comes down to the coast in the eastern quarters of the city. Salerno is in two parts, the old and the new. The old or western part is made up of tightly packed houses in narrow streets and alleys. The growth of the old city along the coast has been restricted westwards by the cliffed hill spur (1,560 ft., only 1 mile inland) of Il Telegrafo (1,998 ft.), and northwards by another steep hill, M. Monaco (1,552 ft.), on the lower slopes of which is a castle guarding the old city. The newer part has developed north-eastwards up the Irno valley and south-eastwards along the coast on to the beach-fringed plain of Salerno, which is here less than a mile wide and is bounded inland by steep mountains. The new part of the city is, accordingly, on level or gently sloping land, and has wide, regular streets.

History

Salerno takes its name from the salt sea (*sal*) and the river Irno, close to the city. It became a Roman colony in 194 B.C. and an outpost of resistance to Hannibal. The Lombards conquered it from the Eastern Empire in 646, uniting it to the duchy of Benevento. In 839 it became a practically independent Lombard principality and remained so until it fell to Robert Guiscard in 1077. Robert made Salerno his capital, and here Pope Gregory VII was brought by his Norman allies to die in 1085. The famous Salerno school of medicine

was at this time at the height of its prestige. Perhaps because of its fame as a health resort it was a centre for the study of the medical writings of the ancient world, and became known as Civitas Hippocratica. It was for long as pre-eminent in medicine as Paris was in theology, or Bologna in law, but after the thirteenth century its European reputation declined. During the later Middle Ages Salerno was held as a fief of Naples by some of the leading noble families of southern Italy—Colonna, Orsini, and Sanseverino—but in 1590 it bought its freedom for 80,000 ducats.

Public Buildings and Monuments

The outstanding monument of Salerno is the cathedral of S. Matteo, dating possibly from the time of Constantine, but built in its present form by Robert Guiscard and consecrated by Gregory VII (1085). It underwent considerable restoration in the eighteenth century. Among its chief features are the fine Romanesque portal, the atrium with 28 ancient columns, the two splendid ambones of Cosmati work, and the Paliotto, or altar-front of ivory with 54 panels, dating from the twelfth century. The body of St. Matthew, patron of Salerno, is preserved in the crypt, and in the upper church are the tombs of Gregory VII and Margaret, wife of Charles III of Naples (d. 1412). The ruins of the Castello, on a hill behind the town, command a magnificent view. Originally a Lombard stronghold it was enlarged by the Normans. In the Via Arce the arches of the Norman aqueduct form an imposing structure. A bronze head of Apollo, discovered in 1930, is a Greek work of the third or second century B.C.

Industry

Salerno is a minor industrial centre, a fishing-port, and an agricultural market for locally produced oranges, tomatoes, chestnuts, tobacco, olives, olive-oil, and wine. There are mills for the manufacture of cotton and woollen goods, a large pasta mill, oil presses, a tobacco factory, and canning factories near by. Tanning and leather dressing is locally important, being dependent on the nearby chestnut forests. Soap and glycerine are made by I.S.S.A. and Portland cement by the S.A. Italcementi. Bricks and tiles are also made locally.

Description of Port

The approaches to the port of Salerno are unobstructed. The sea-wall fronting the town has been protected by two detached

breakwaters parallel to the shore. The longer, which is known as the Diga Frangionde, is nearly 2,600 feet long and lies about 230 feet off shore. The shorter breakwater lies farther west, and most of the area between it and the shore has now been reclaimed. Off the west end of the Diga Frangionde is a small section of breakwater, while about 650 feet from its other end a mole extends south-west for some 600 feet from the shore. This is the only part so far completed of a breakwater designed to enclose a large outer harbour.

The harbour proper is at the west end of the town, where a flat point has been built up and quayed, and a rectangle of water is protected by a mole built in three sections to its west and south-west. The entrance, between the quay on the head of the point and the junction of the two outer sections of the mole, faces east and is about 350 feet wide with depths of 26 feet in the fairway.

The outermost section of the mole is alined south-east and north-west and is known as the Molo Foraneo. It is, like the rest of the mole, quayed on the inner face with a high protective parapet on the outside. At its shoreward end there is a sharp angle to the Vecchio Antemurale running west-south-west, and this in turn curves north-north-west into the Molo di Ponente, whose root has been widened into a dog-legged quay, the Banchina 3 Gennaio. The north shore of the harbour is not quayed, but at the eastern end there is a small shipyard with four slipways. The eastern side of the harbour, opposite the Banchina 3 Gennaio, is formed by a quay the shoreward half of which is called the Banchina Manfredi and the seaward half the Banchina Osvaldo Conti. At right angles to this quay, extending eastwards and facing the harbour entrance, is the Banchina Tommaso Lamberti, which is lengthened eastwards by a rough groyne. A flat beach, the Spiaggia Santa Teresa, curves north-east from inside this groyne to the sea-wall.

The harbour is subject to rapid silting, but depths of 29 feet are normally dredged over most of it. Quay heights are about 3 feet above high water, and ships usually berth stern-to and load and discharge by lighter. The whole harbour area is open to the town.

Facilities. The office of the Captain of the Port and the customs-house are both behind the Banchina Manfredi.

The main warehouse is the Magazzini Generali on the Banchina Osvaldo Conti, a two-story building with single-story wings. Some of the other buildings in this area may well be used as storehouses. A stock of coal is normally held, and near the root of the mole at the east end of the town is a cluster of three oil tanks. There are hydrants

only on the Banchina Manfredi: ships elsewhere are supplied by water-boats. Lighting is electric. The port is very poorly equipped with cranes, for there is but one fixed 2-ton crane on the Banchina Manfredi.

The shipyard in the north-east of the port is capable of handling vessels up to 200 feet long in its four slipways, and minor repairs can be undertaken. There are in the town engineering firms and a foundry.

South-east of the railway station in the east of the town a spur leaves the main line and passes westwards along the sea front to the harbour, where it serves the east quays. Tracks have recently been laid on the Banchina 3 Gennaio connecting round the north of the harbour and through the shipyard with those on the Banchina Manfredi. Both the west and the east sides of the harbour are served by roads, and exit is easy to the through road along the sea front and to the town.

Trade and Connexions. The trade of the port is not large. Imports consist chiefly of coal, cotton, grain, and timber, while the main exports are local products such as oil, wine, and fruit.

A daily steamer service connects with Amalfi, Capri, and Naples, and the Genoa-Tobruk service calls once a month.

Name	Depth alongside (feet)	Length (feet)	Facilities, &c.
Molo Foraneo . . .	13-28	c. 1,155	..
Vecchio Antemurale . . .	6-15	c. 1,175	..
Molo di Ponente . . .	15-20	c. 775	..
Banchina 3 Gennaio			
South end (head) . . .	18	c. 120	..
Southern section . . .	13-22	c. 525	..
Northern section . . .	3-13	c. 350	..
Banchina Manfredi . . .	3-18	c. 670	Port offices and customs-house behind shipyard at north end.
Banchina Osvaldo Conti . . .			
Banchina Tommaso . . .			
Lamberti	1	c. 190	Useless as a quay.

Inland Communications

Railways. Salerno is on the double-track electrified line from Naples to Battipaglia, where it divides for Brindisi and for Reggio di Calabria. A single-track line goes to S. Severino Rota, the junction for Benevento. There is an electric tram from Salerno to Pompeii.

Roads. Salerno is on road 18 from Naples to Reggio di Calabria, and on road 88 to Avellino. Another main road leads to Amalfi and Sorrento.

Airways. There is a seaplane anchorage just west of the town.

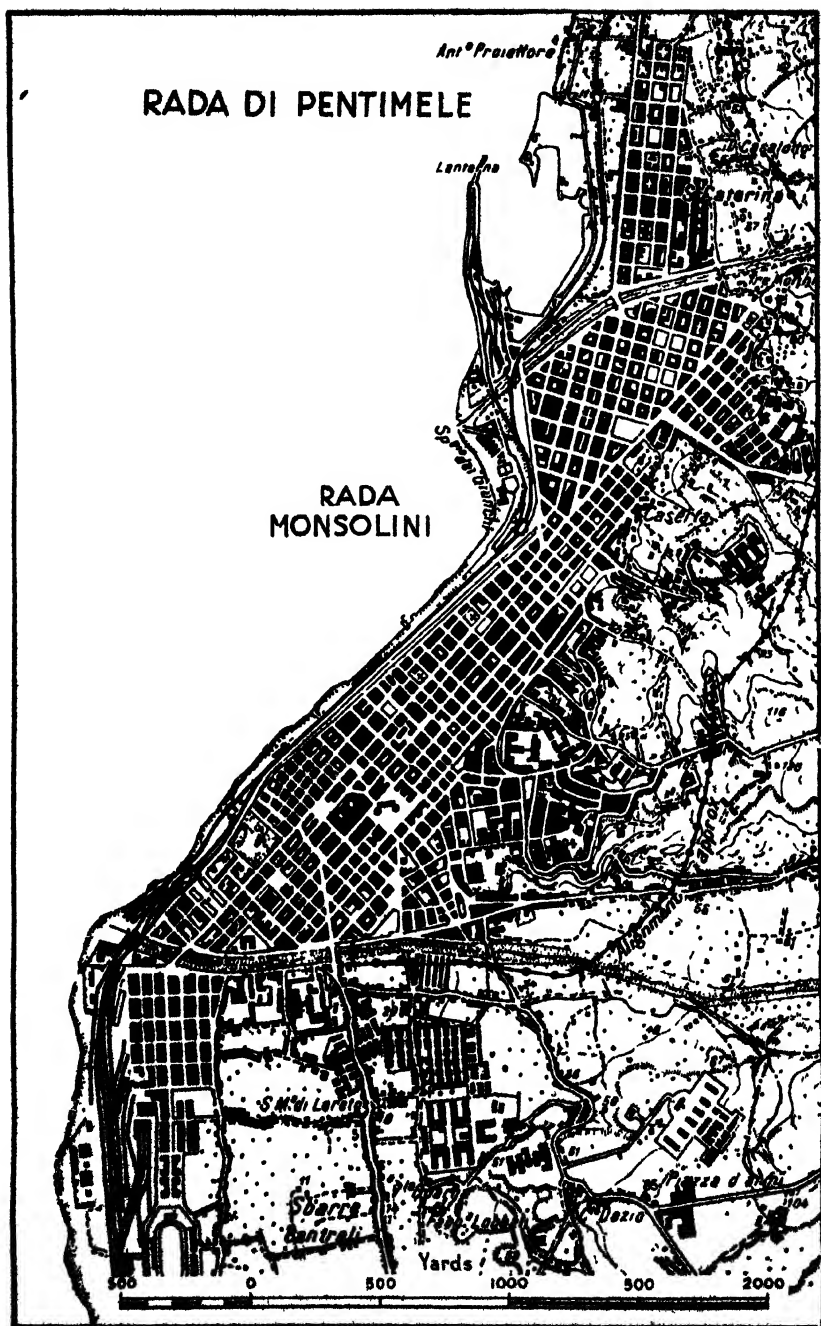


FIG. 20. *Reggio di Calabria*

RÉGGIO DI CALABRIA. Latitude $38^{\circ} 7' N$. Longitude $15^{\circ} 40' E$.
Population 60,342. Provincial capital. Seat of archbishopric.
Chamber of Commerce.

Position and Site (Fig. 20)

Reggio is on the south-west coast of the toe of Italy, where, south of the gulf of Gioia, the coastal plain narrows and is backed closely by the terraced sandstone foothills rising to the plateaux of the Aspromonte on the east. The elongated city extends from north-east to south-west along the narrow coastal plain and up the terraced foothills to a height of about 150 feet. The main part is bounded on the north by the Fiumara dell' Annunziata and on the south by the Fiumara Calopinace, but suburbs stretch considerably beyond both. To the north beyond the Annunziata the coastal plain widens and the industrial suburb of Rione di S. Caterina rises on gentle slopes from the horseshoe-shaped harbour basin. South, beyond the Calopinace, industrial suburbs give way to houses scattered over the foothills or straggling along the main road towards the plain of the Fiumara S. Agata, where immediately south of the river mouth there is an airfield. There is no old or new town in Reggio as it was entirely rebuilt after the earthquake of 1908. It is probable, however, that the original site was on the steeper slopes where it could be more easily fortified, even though at some distance from the harbour. The present town is laid out on a chess-board pattern with single-story houses of concrete, and its main streets, running from north to south, are intersected by much shorter ones from east to west. The railway which runs along the coast forms the seaward edge of the town, and parallel to it and immediately above runs the broad double street of the Viale della Marina and the Corso Vittorio Emanuele, with public gardens affording an uninterrupted view across the straits of Messina. Behind these roads the town climbs gradually to the Corso Garibaldi, which, with its adjoining streets, forms the chief business centre. The reinforced concrete cathedral stands in an adjoining square, and beside it rise the two surviving towers of the ancient Castello (82 ft.).

History

The Greek city of Rhegion was founded in the eighth century B.C. by colonists from Chalcis, who were afterwards joined by refugees from Messina. These last represented the democratic element in the city, and the Chalcidians the aristocratic, but in spite of internal

feuds, the city became a flourishing commercial centre. In 494 B.C. Rhegion set up a tyrant, Anaxilas, who also made himself master of Messina, and defended the straits against the Etruscans. In 386 B.C. it was taken by Dionysius, tyrant of Syracuse, after an eleven months' siege, and never recovered its former prosperity. Forced to yield to the Romans, it became known as Rhegium, but even as a Roman municipium under Augustus it retained its Greek speech and character. It marked the limit of Alaric's conquests, being sacked by him in A.D. 410. During the sixteenth century it suffered much from the depredations of Barbary corsairs, among them the famous Kheireddin Barbarossa, who burnt the city in 1543. Occupied by the French in 1808, English ships bombarded it in 1810. It rose against the Bourbon Government in 1847, and in 1860 Garibaldi landed here for his conquest of Naples. From early days it was subject to earthquakes, and was completely destroyed both in 1783 and in the terrible Messina earthquake of 1908. Thus it is to-day a new city.

Public Buildings and Monuments

All the public buildings of Reggio are modern, including the cathedral, built in the Romanesque style. In the Piazza del Castello two massive towers of the fifteenth-century fortress survive. The Antiquarium has a fine collection of bronzes, terra-cottas, and vases, and the Museo Comunale also contains relics of the ancient city as well as some pictures.

Industry

Reggio is a commercial and fishing-port as well as an agricultural market for oranges, lemons, figs, olive-oil, and wine. Industry for the most part is limited to the processing of agricultural products. The most important is the preparation of citrus-fruit products, calcium citrate, and the essential oils of oranges, lemons, bergamot, and of flowers. Fruit is also canned and crystallized. There are mills for the spinning of local silk, factories for briar pipes and furniture, and bricks and cement works.

Description of Port

Reggio is the most important commercial port in the Calabrian peninsula and one of the mainland termini of the Messina train ferry.

The harbour lies northward of the town, from which it is separated by the T. Annunziata. It consists of an artificial basin, some 400

yards long by 350 yards wide, protected on the west by a broad mole built northwards from the north side of the mouth of the Annunziata.

Anchorage may be had either south of the harbour in the Rada Monsolini off the town, or north of the harbour in the Rada di Pentimele. In the latter, the notorious currents of the straits are less violent. From any direction, however, they make necessary a careful approach to the harbour.

The entrance faces north-north-west and is approximately 390 feet wide between an extension of the western mole and the sea-wall containing reclaimed land on the east. Ruling depths are 28 feet with a depth of 26 feet in the entrance.

Quays extend round the west, south, and east sides. In the south-west is the train-ferry terminus, its approach flanked by two short jetties, the only ones in the port. The north-eastern part of the harbour is still incomplete, although certain shipbuilding facilities exist at the north end of the east quay and there is an unquayed basin about 550 feet long by 300 feet wide, at present used by fishing-craft.

Berthing is normally alongside on the western mole and stern-to elsewhere, with loading and unloading by lighter. Quay heights above mean sea-level are about 5 feet.

The harbour sustained considerable damage from bombing and shelling during 1943.

Outside the harbour area at the south end of the Rada Monsolini and below the Vittorio Emanuele memorial there is a stone jetty, 72 feet long, 26 feet wide, and 5 feet high, with depths of 4 feet at its head.

Facilities. There are no cranes except the one in the boat yard. A floating crane was at times berthed in the harbour. The local Chamber of Commerce have a warehouse on the mole, and a cement depository lies at its south end. Apart from this there is little, if any, storage space. Stocks of coal belonging to the State Railways and to private firms are normally maintained at the south end of the mole. Three oil tanks are buried about half a mile north-east of the port (Appendix II). There are water hydrants on the mole and the south quay, but in summer water is often scarce. Electricity is supplied to the harbour area.

Small repairs to hulls and machinery can be undertaken in the workshop near the root of the mole. The few other repair facilities are in the north-east, where there is a patent slip capable of accommodating vessels of 80 feet long, and a small shipbuilding yard to its west, equipped with the only crane in the port.

The main railway line from San Giovanni following the coast to Reggio skirts the east of the harbour on an embankment. The harbour spur leaves this line about 200 yards south of the T. Annunziata, striking north-west on to the western mole and crossing the river on its own bridge. At the root of the mole are the railway workshops and on their north are several sidings, across which rolling-stock has to be shunted to reach the train ferry. The Stazione Marittima is on the quay on the west side of the berth.

Trade and Connexions. The main activities of the port are concerned with the train-ferry service to Messina, to which there are five sailings each day. Of the commercial trade, imports include coal, mineral oil, cement, and timber, while the chief exports are raw silk, olive-oil, wine, citrus fruit, and figs. Fishing is also important.

Two of the fortnightly Genoa-Fiume coastal services call at the port.

<i>Name</i>	<i>Depth alongside (feet)</i>	<i>Length (feet)</i>	<i>Facilities, &c.</i>
Western mole . .			Rough boulders outside. Quayed inside.
Northern extension . .	..	290	Not used for berthing.
Northern half . .	18	c. 560	} Slightly dog-legged. Rail tracks. } Warehouse and cement depository.
Southern half . .	24	c. 500	
South-east extension . .	19	200	..
Ferry terminal . .	c. 13	c. 100	V-shaped berth. West quay c. 170 ft. long with Stazione Marittima behind.
Southern quay . .	24-28	400	Captain of the Port's office and customs-house.
Eastern quay . .	..	..	Dog-legged. Berthing alongside.
Southern part . .	31	840	..
Northern part . .	30	420	Boat camber and slipway at north end.

Inland Communications

Railways. A single-track electrified line runs from Reggio to Battipaglia, and continues as double-track electrified to Naples. A single-track line extends from Reggio along the south coast of Calabria to Catanzaro, Metaponto, and Taranto. A train-ferry service is operated between Reggio Marittima and Messina Marittima.

Roads. Road 18 goes from Reggio to Salerno and Naples, and road 106 follows the south coast to Crotona. A secondary road leads inland into the Aspromonte.

Airfield. There is a landing-ground about 2 miles south of the city near the mouth of the Fiumara S. Agata.

CROTONE (formerly Cotrone). Latitude 39° 5' N., 17° 8' E. Population 19,163. Seat of bishopric.

Position and Site (Fig. 21)

The Crotone peninsula, the south-east extension of the Marchesato hill land, rises on the west to the Sila mountains. The tableland (c. 500 ft.) in the centre of the peninsula and the steep north coast ending eastwards in the windswept headland of Cape Colonne force the main road and railway inland between S. Leonardo, on the gulf of Squillace, and Crotone, on the north coast of the peninsula. North of Crotone the coastal plain broadens into the marshy wooded and sparsely populated delta of the F. Neto. The main road north turns inland following the more populated hill slopes edging the coastal plain, and shortly north of Crotone is joined by the main road from the Tyrrhenian coast. Crotone is thus an important route centre, and also the only considerable port between the gulf of Squillace and the gulf of Taranto.

The main and oldest part of the town is built on a promontory with its ancient Castello (140 ft.) overlooking the harbour on the eastern tip. The newer parts are chiefly built along the main road which crosses the 100-foot raised beach towards the station, about 1 mile to the west. On either side of the railway are the chemical factories which form the industrial quarters of the town.

History

Croton, one of the most famous cities of Magna Graecia, was founded in 710 B.C. by colonists from Achaia, directed thither, according to tradition, by the Delphic oracle. Another Achaean colony founded about the same time was that of Sybaris, where the sumptuous living of the citizens has made 'sybarite' a synonym for luxurious. The Crotons, on the other hand, were famed for their athletic skill, their knowledge of medicine, and for the frugality and discipline inculcated by the philosopher Pythagoras, who settled there in 532 B.C. For long the two cities lived in friendship, but in 510 B.C. war broke out between them, and the Crotons, under their champion Milo, utterly defeated the Sybarites, their city being razed to the ground. Croton too suffered a severe defeat from another neighbour, Locri, and in 299 B.C. the city passed under the control of Agathocles, tyrant of Syracuse. Later it became a Roman colony, but did not regain its ancient splendour. During the Middle Ages and until 1928 it was known as Cotrone. In 1541 it was fortified by

Don Pedro di Toledo, Charles V's Viceroy in Naples, and many of its ancient buildings were sacrificed to build the walls and castle. Much of George Gissing's *By the Ionian Sea* was written during a visit to Crotona (1897).

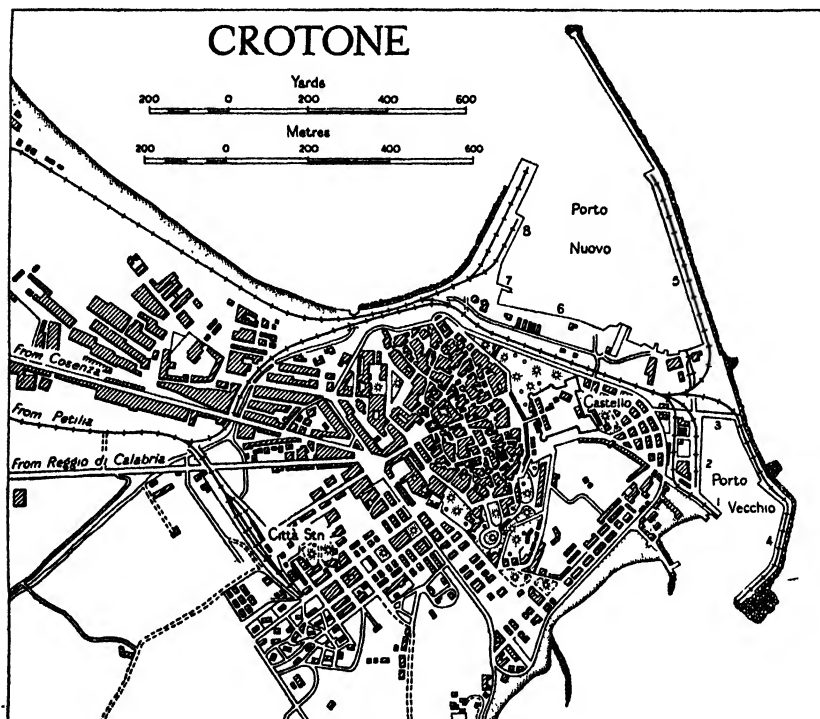


FIG. 21. *Crotona*

Public Buildings and Monuments

The large but uninteresting nineteenth-century cathedral contains a much venerated Madonna di Capocolonna, a Byzantine work. The Castello, built in the sixteenth century on the site of the ancient acropolis, has fine twin towers. Within it is the Museo Civico, containing local antiquities, including some of the beautiful coins for which Crotona was noted. A single Doric column at Capo Colonna, some 7 miles from the city, is all that remains of the great temple of Hera Lacinia.

Industry

Crotona is a market town, and except for its two large chemical factories has no notable industry. The Società Meridionale Ammonia,

controlled by the Montecatini combine, has an electro-chemical plant with an annual capacity of 27,000 tons of fixed nitrogen (by the electrolytic process), 90,000 tons of nitric acid, and 100,000 tons of superphosphates. The Societa Mineraria e Metallurgica di Pertusola produces 12,000 tons of electrolytic zinc a year, mainly from zinc concentrates imported from Sardinia. Both these large factories are dependent on hydro-electricity supplied by the nearby Ampollino schemes.

Description of Port

The port of Crotone consists of two small harbours. Porto Vecchio and Porto Nuovo, which lie respectively south and north of a spit of land projecting eastwards below the Castello. Each is protected on the east, or seaward, side by a breakwater built south and north from the head of the spit, and enclosed by a mole projecting towards the head of the breakwater from farther inshore.

The safest anchorage is south and south-east of Crotone and the approaches are clear of obstruction. Ships entering Porto Vecchio should, however, give its breakwater good clearance since a rocky shoal extends from its broad head.

Porto Vecchio. The entrance faces south-south-west and is about 450 feet wide with depths of 16 feet. On the east is the breakwater previously mentioned, Molo Vecchio: it is dog-legged, with rough blocks and a protective parapet on the seaward side, and quays on the inside. On the west, that is to say along the shore, the 'Sanita' jetty lies opposite the head of the breakwater, with a landing-stage (depth alongside 6 ft.) on the north-eastern side near its head. North-east of this jetty a sandy beach trends north-east for about 150 yards to the Western Mole, on the south of which is a small shipyard. The north-east face of the mole is quayed; and, like the eastern breakwater, is served by a narrow-gauge railway. The inner part of Porto Vecchio is quayed on its west and north, but depths shoal rapidly towards the latter.

Porto Nuovo. Porto Nuovo lies to the north-east of the town and faces north. The entrance, facing north-west, is 815 feet wide with depths of about 30 feet between the heads of the breakwater on the east and the Molo Giunti on the west. The harbour enclosed by these two is roughly triangular, with depths of 30 feet in the centre, shoaling rapidly southwards. The eastern breakwater is a rubble mound with a rough exterior and parapet, and quayed along the southern half of the inside. The Molo Giunti is quayed in two steps

on the inside, and served, like the eastern breakwater again, by the harbour railway. At its root a short jetty (south-west) projects eastwards and has a length of quay to its south. The southern shore is quayed in the western half, and at the eastern end of this quay there is a slipway which projects into the harbour. The rest of the south shore to the root of the breakwater is not quayed, but there are two small landing-jetties.

Quay heights vary between 5 and 8 feet. The quays of the Molo Vecchio, of the Porto Nuovo breakwater, and of the Molo Giunti are respectively about 5 or 6 feet, 8 feet, and 6 to 7 feet high. Along-side berthing is possible except at the north end of the Molo Vecchio.

Facilities. The Health office is at the root of the 'Sanita' jetty, and that of the Captain of the Port is back of the beach to its north-east. The customs-house lies near the root of the Porto Nuovo breakwater.

There is one portable travelling 7-ton crane on the breakwater quay of Porto Nuovo, and one of a similar type but of 9-tons capacity on the Molo Giunti. Porto Vecchio has possibly two small cranes on its west quay. Storage space is limited to the warehouses behind the west quay of Porto Vecchio and those near the west end of the south quay of Porto Nuovo. At the east end of this latter there is a number of sheds.

A small stock of coal is normally maintained, but there are no supplies of oil. Supplies of water are somewhat short in summer. Hydrants are situated as follows: in Porto Vecchio, 2, probably on the west quay; in Porto Nuovo, 4 on the Molo Giunti and 2 on the breakwater quay. Electric power is supplied to the harbour area, but details of lighting are not known.

The repair yard south of the west mole of Porto Vecchio is for fishing-boats and has a small slip. In Porto Nuovo the patent slip at the east end of the south quay is capable of handling ships up to 80 feet in length. In its rear is a repair yard and workshops which can execute repairs to hulls and machinery of small craft. A hauling-up beach lies just east of the slipway.

The railway from Reggio di Calabria to Taranto and Brindisi passes through Crotone, but does not serve the port. The harbour lines are a branch of the narrow-gauge line from Crotone to Petilio Policastro, and there is a siding leading to the standard-gauge marshalling yard at the main station. The harbour branch passes behind the south quay of Porto Nuovo and sends spurs on to the Mole Giunti, the two breakwaters, and the west quay and mole of Porto Vecchio. Another narrow-gauge line (privately owned) leaves the harbour system at

the root of the Molo Giunti and runs westwards to the chemical works in the north-west of the town and thence inland.

A wide road encircles the Castello on its north, east, and south, and connects with the main roads running westwards and southwards inland. Porto Nuovo, enclosed by a wall, has only one exit to this road, and that just south of the slipway, but there is direct access to it at several points from the quays of Porto Vecchio.

Trade and Connexions. In 1938, 681 ships totalling 319,290 tons made use of the port. Imports totalled 175,605 tons and exports 185,799 tons. The principal activity of the port is handling zinc concentrates for the refinery and phosphates for the chemical works, and exporting the products of these two factories. Local produce such as grain, olives, and liquorice are also exported.

No.	Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
<i>Porto Vecchio</i>					
1	Western mole . .	18-20	240	—	Shipyard on beach on south side. Head 80 ft. wide.
2	West quay . .	16-18	550	? 2	Depths of only 6 ft. at north end.
3	North quay . .	1-6	280	—	—
4	Molo Vecchio . .	6-18	c. 480+ 260+450 +375	—	Dog-legged. Outside rough boulders. Inside quayed, but inner leg of 480 ft. foul.
<i>Porto Nuovo</i>					
5	Eastern breakwater .	..	..	..	Rough boulders outside and parapet wall. Southern quay slightly dog-legged in northern 100 ft. Customs-house near root.
	Northern section .	c. 25	c. 1,200	—	
	Southern quay .	13-25	1,370	1	
6	South quay . .	Shoal	900	—	Slightly dog-legged. Slipway projects at east end.
7	South-west quay .	..	70	—	..
	South west jetty .	..	45	—	..
8	Molo Giunti . .	..	..	..	Width of head c. 135 ft.
	Outer section .	c. 25	400	1	Inner section off-set c. 90 ft.
	Inner section .	10-25	380+170	—	..

Inland Communications

Railways. Crotona station ($1\frac{1}{2}$ miles from the city) is on the single-track line from Reggio di Calabria to Metaponto and Taranto, whilst a narrow-gauge railway from Crotona Citta to Petilia Policastro also serves Crotona Scalo, near the main station.

Roads. Crotona is on the Ionian coast road (106). This road is joined near the city by roads 109 and 107 which lead respectively to Catanzaro and Cosenza.

TÁRANTO. Latitude 40° 28' N. Longitude 17° 15' E. Population 103,306. Provincial capital. Seat of archbishopric.

Position and Site (Fig. 22)

Taranto, at the head of the gulf of Taranto, is built round the semicircular shores of the Mare Grande, a small bay. A short and narrow isthmus, the tip of which has been artificially turned into an island, separates the Mare Grande on the south-west from the Mare Piccolo on the north-east. The Mare Piccolo, an inlet about 5 miles long from east to west, is nearly divided into two halves by a narrow wedge-shaped peninsula. The Mare Grande and the Mare Piccolo are fringed by low plains of clay and sand. To the east of the Mare Piccolo and about 3 miles from it, however, there extends the bare, flat-topped ridge of the Murge Tarantine (c. 350 ft.), whilst to the north-west about 6 miles inland rise the deeply incised foothills of the Murge.

Taranto Vecchia, the original city, forms the central nucleus. It is built on an oblong island formed by the two canals linking the Mare Grande with the Mare Piccolo. On the mainland to the north of the old city is the Borgo della Stazione, the commercial quarter near the railway station. To the south-east of Taranto Vecchia, on the narrow isthmus, is Taranto Nuova, the modern, administrative quarter. Both these parts of the town are joined to Taranto Vecchia by road bridges. Taranto Vecchia is closely built up, and, except for the four principal streets, communication is mainly by winding alleys. The imposing Castello S. Angelo is at the south-eastern tip of the island. The other more modern quarters of the city are better planned and have wider streets. The chequer-board appearance of the blocks of houses in Taranto Nuova is particularly notable.

History

The Spartan colony of Taras was founded in 708 B.C. and after successful struggles with neighbouring tribes became the greatest city in Magna Graecia. Its prosperity rested on its excellent port, its woollen industry, and its dye-works, and it was noted as a centre of Pythagorean philosophy. The site of the Greek city was that of the present Città Nuova, the island on which the medieval Città Vecchia grew up being a necropolis. In the third century B.C. Taranto came into conflict with the expanding power of Rome. The citizens summoned Pyrrhus, King of Epirus, to their aid, who, on being obliged to go home, left a garrison in Taranto under the charge of

one Milo. When the Romans besieged the city, Milo turned traitor and delivered it over to its enemies. Enormous booty was taken, and many young nobles were removed to Rome, while the city again suffered severe punishment in 209 B.C. owing to the support which it had given to Hannibal in the second Punic War. Nevertheless, it remained a Hellenic city, only becoming latinized under the Empire. In A.D. 927, it was completely destroyed by the Saracens, and remained for forty years a desert until it was rebuilt by the Eastern Emperor Nicephorus Phocas. In 1301 Charles II of Anjou made it into a principality and conferred it on his son Philip; afterwards it passed to the Orsini. Gianantonio Orsini, Prince of Taranto, was in the fifteenth century the greatest noble in the kingdom, and to his aid Alfonso of Aragon largely owed his throne. On his death in 1463 his huge estates reverted to the Crown and Taranto shared the common history of the kingdom of Naples. During the war of 1915-1918 it was much frequented by the Allied fleets as a naval base.

Public Buildings and Monuments

The Cathedral of S. Cataldo on the island constituting the Città Vecchia is dedicated to the Irish saint, Cathal of Munster, who settled here in the seventh century. The present building dates from the eleventh century, but has been much restored. The sumptuous baroque Capella di S. Cataldo contains the relics of the saint and ten statues of other patrons of Taranto. The Castello, originally a Byzantine fortress, was rebuilt by Ferrante, King of Naples, in 1480, when the Turks occupied Otranto, and the canal separating the Città Vecchia from the Città Nuova was cut at the same date as a further measure of defence. The Museo Nazionale, in the Città Nuova, contains one of the most important collections of Romano-Greek vases and statues in southern Italy. Here too is the arsenal, founded in 1883, and second only in importance to that of La Spezia.

Industry

The main industries are shipbuilding, fishing, and the manufacture of olive oil, sulphur oil, and soap. Taranto is an important naval base and has a government shipyard as well as the Cantieri Tosi yards. Only repairs are carried out in the naval yards, but the Cantieri Tosi can build medium-sized vessels and submarines. Many of the olives, which are grown extensively in the district, are pressed in the city, where the Olefici dell' Italia Meridionale has a refinery. The same firm has a works for the preparation of sulphur oil from the

residue of the olive husks. A number of small factories make this oil into soap. The Montecatini Combine has a works for superphosphates and sulphuric acid. The preserving of locally produced fruit and vegetables is also important, and the Cirio company have a canning factory. Other products include rope and twine, agricultural machinery, and cement.

Description of Port

The great naval base of Taranto consists of a large oval outer harbour, Mare Grande, with a small commercial harbour (Porto Mercantile) on its northern shore, and an inner harbour to its north-east, Mare Piccolo, which is almost land-locked.

The vast anchorage of Mare Grande, some $4\frac{1}{2}$ miles from east to west and $3\frac{1}{2}$ miles from north to south, is in part naturally, and in part artificially, protected. The protection afforded by the islands of S. Pietro and S. Paolo on its south-west has now been increased by an awash breakwater which joins them to each other and, with two narrow breaks, to Point Rondinella on the mainland to their north. On the south side of the bay another awash breakwater, the Diga di S. Vito, has been built out north-west towards S. Paolo from a point about 1 mile north of Cape S. Vito.

The entrance to the outer harbour is between the head of the Diga di S. Vito and a breakwater projecting south-eastwards towards it from the south-east side of S. Paolo. It is $\frac{3}{4}$ mile wide with depths of more than 60 feet in a fairway of 800 yards. There is anchorage for vessels in the centre and east of the bay, but the western half is a prohibited area. Depths vary from 36 feet to 96 feet, except in the centre, where, on the Banco della Sirena, there are least depths of only 25 feet.

Around the shores of the Mare Grande there are several piers and basins. On S. Paolo the inner side of the breakwater is quayed, and on the north shore of the island two moles form a small harbour reserved for naval craft and tugs. In the centre of the eastern shore of S. Pietro there is a masonry pier. On the north shore of the bay, apart from the commercial harbour, there are two piers, one about $\frac{1}{4}$ mile east of Point Rondinella and the other abreast the west point of the island of S. Nicolicchio, and a jetty about 500 yards west of the commercial harbour. Along the east shore of the bay there is a jetty about 1,000 yards east of the root of the Diga di S. Vito, and from a point nearly a mile to the east of the jetty a long awash breakwater, the Diga di Tarantolo, curves with two narrow openings through it,

north-west and north, into the harbour. Immediately north-east of its root there has recently been considerable reclamation along the shore. Within the protection afforded by this breakwater and $\frac{3}{4}$ mile to its north-east, there is a Y-shaped oiling jetty. Between this last and the southern outskirts of Taranto Nuova extensive stretches of the shore are being reclaimed to form a new destroyer base, and a large graving-dock is being excavated. Lastly, on the shore fronting Taranto Nuova there are many bathing establishments and among them two piers used as landing-stages for naval personnel from vessels at anchor in Mare Grande.

The commercial harbour, Porto Mercantile, at the north-west end of Taranto Vecchia and south of Borgo della Stazione, is protected by two converging moles (Molo di Ponente and Molo di Levante) and the entrance between their heads is 600 feet wide with depths of 26 feet. Both are rough rubble on the outside and quayed on the inside, and both have a spur projecting inwards at the head. The rest of the harbour is quayed, but the only straight length is immediately north-east of the root of the western mole. The north shore is curved, while the eastern side is irregular. Both are shoal and suitable only for stern-to berthing. In the western half ruling depths are 26 feet, and an area off the north-west quay has been dredged to 43 feet. In the north-east corner is the Ponte di Porta Napoli connecting Taranto Vecchia with the mainland. Small boats can pass beneath its three arches into the Mare Piccolo.

The Mare Piccolo is divided into two basins, of which the eastern is the larger, by the peninsula extending from the north shore and ending in Punta della Penna. The entrance to the Mare Piccolo is called the Canale Navigabile or Passaggio Piccolo. Cut through the neck of the isthmus between the outer and inner harbours, it is about 400 yards long with a minimum width of 189 feet between the abutments of the two-leaf swing bridge spanning it. There are depths of 39 feet in the centre of the channel and quays line its sides.

The naval port stretches along the southern shore of the western basin. Quays extend eastwards from the entrance canal for nearly 1,500 yards to a mole which extends east-north-east, and is referred to as the Dockyard quay mole. In the centre of these quays is a mole at right angles to them and often known as the Old Coaling quay mole. To its west the quay has offset wooden wharves for stern-to berthing of destroyers and cruisers, and there are short piers for berthing tugs. To its east is the Arsenal quay, which has at its eastern

end a group of submarine pens. The Dockyard quay mole has at its root, on the north side a pier projecting north, and on the south side the Artillery quay which extends south-eastwards to the dockyard. The dockyard has two dry docks, building slips and repair basins, and a wide range of shops. The shore north-eastwards to the promontory opposite Point della Penna is still being developed, but a coal quay, the Calata Carrieri, and a boat camber are already in commission.

The shoreline of the rest of this western basin is not so fully developed. On the north-east side of Taranto Vecchia, however, there is a quay near the fish market at the north-west end and a hard in the centre, while some reclamation has recently been carried out to construct quays at the south-east end. Borgo della Stazione has, from south to north along its shore, two boat cambers, two small shipyards, a long pier, the Pontile del Genio Marina, and quays for lighters. A ship-building yard, the Cantieri di Construzione Navale Tosi, lies at the northernmost point of the basin, with several moles and building-slips round a rectangular quayed inlet. Some 200 feet north of Point della Penna is a T-shaped pier for discharging oil, and pipe-lines run along it to the tanks near its root.

The eastern basin is less developed than the western. The passage between them is about 550 yards wide, but the fairway is reduced by a shoal to some 600 feet. Depths are from 18 feet to 25 feet. Along the southern shore a pier, known as the Torpedo Range pier, projects eastwards on the east side of the point opposite Point della Penna. About $\frac{1}{2}$ mile to its south-east is the seaplane base, with quays, a camber, and servicing shops and jetties. There is a short pier about 1 mile east of the seaplane base and another longer pier, an oiling jetty, at Il Fronte. The eastern and northern shores have only an occasional pier or jetty for purely local uses, but there has been some considerable development of the north-west shore. Approximately 1,000 yards north-east of Point della Penna at Buffoluto is a pier projecting east-north-east. The shore to its north-east has been quayed for nearly $\frac{3}{4}$ mile in three stretches, and the main ammunition depot of the port lies behind them. Towards their north-east end two moles at right angles to them form the Porticciolo di Buffoluto, where projectiles, mines, and torpedo heads are handled, and a camber is formed by a mole projecting south-west parallel to and some 250 feet from the shore.

The height of most quays is 6 feet, and berthing is normally stern-to, with discharging and loading by gangways or lighters.

The port suffered considerable damage from aerial attacks in 1943, but reclamation and development have gone on all through the present war.

<i>Name</i>	<i>Approximate length (feet)</i>	<i>Depth at head (feet)</i>	<i>Facilities, &c.</i>
<i>Mare Grande</i>			
<i>I. San Paolo:</i>			
South-east mole . . .	650	13	Crane at head. Decauville track. Depths in harbour between 11 ft. and 13 ft. Reserved for government craft.
Harbour, east mole . . .	300+300	..	
Harbour, south quay . . .	250	..	
Harbour, west mole . . .	160	..	
Breakwater, I. San Paolo to I. San Pietro . . .	3,600	—	Straight.
Pier on I. San Pietro . . .	180	13	Crane on widened head.
Breakwater, I. San Pietro to mainland	150+7,500 +1,900	..	Curving, north to north-east. Two passages respectively 50 ft. and 270 ft. wide.
Pier east of Punta Rondinella	230	10	Slightly T-shaped.
Pier off west end of I. San Nicolicchio	140	4½	Slightly T-shaped. Large marshalling yard and sheds at root.
Jetty west of Porto Mercantile	150	..	..
Diga di San Vito . . .	5,850	—	North-west, curving to west-north-west.
Jetty east of Diga di San Vito	400	..	Protective breakwater to west.
Diga di Tarantolo . . .	1,200+5,200 +1,200	—	Built on shoal north-west curving north to Secca della Tarantola. Two passages respectively 350 ft. and 230 ft. wide.
'Y' jetty, stem . . .	900	—	Oiling jetty. Pipe-lines to installations inland.
„ arms . . .	450	26	
<i>Taranto Nuova</i>			
Pontile Ammiraglio Galleani	170	10	L-Shaped: head 150 ft. long. Landing-stage for naval personnel.
Pontile Ammiraglio Rota	200	6	Outer 80 ft. widened. Landing-stage for naval personnel.
<i>Porto Mercantile</i>			
Molo di Ponente . . .	23-26	120+ 1,320	Railway tracks and warehouses.
North-west quay . . .	26	460	..
Molo di Levante . . .	6-26	600	..
<i>Mare Piccolo (Western Basin)</i>			
Pontile del Genio Marina . .	6-24	c. 870	Stone pier with railway tracks. 1 crane.
Punta della Penna pier . . .	3-27	c. 540	"T"-head c. 280 ft. long. Pipe lines.
Destroyer wharf . . .	..	2,350	Broken by short piers. Offset wooden wharves.
Old Coaling Quay mole . . .	1-21	c. 300	West side lengthened c. 200 ft. by jetty.
Arsenal quay . . .	c. 23	c. 1,300	Oil tanks behind, c. 500 ft. away.

<i>Name</i>	<i>Approximate length (feet)</i>	<i>Depth at head (feet)</i>	<i>Facilities, &c.</i>
<i>Mare Piccolo (Western Basin) (contd.)</i>			
Submarine basin . . .	..	450	West jetty <i>c.</i> 175 ft. long; east jetty <i>c.</i> 500 ft. long, pens on inner part of west side; north jetty <i>c.</i> 570 ft. long, <i>c.</i> 310 ft. off, and overlapping west jetty.
Dockyard Quay mole . .	6-13	<i>c.</i> 550	Pier <i>c.</i> 300 ft. long projects north from root of north-west side. Width of mole <i>c.</i> 110 ft. 1 crane on north-west quay.
Artillery quay . . .	15-23	1,080	Fixed 160-ton jib crane at south end.
Dock yard . . .	..	—	Four lengths of quay: (a) 225 ft., (b) 360 ft., (c) 330 ft., (d) 350 ft. West of and inside <i>b</i> , a double basin, western 300 ft. × 180 ft., eastern 240 ft. × 120 ft. 4 travelling cranes, 1 on each side of 2 dry-docks.
Calata Carrieri:			
West quay . . .	..	480	..
North quay . . .	..	500	Being lengthened eastwards to <i>c.</i> 1,200 ft.
Boat camber . . .	<i>c.</i> 8	315	Width <i>c.</i> 180 ft., with <i>c.</i> 75 ft. entrance in south-west corner.
<i>Mare Piccolo (Eastern Basin)</i>			
Torpedo range pier . .	18-26	<i>c.</i> 800	Inner 260 ft. widened. Large building at head.
Il Fronte pier . . .	6-25	<i>c.</i> 1,700	Oiling pier; pipe-lines.
Buffoluto:			
South pier . . .	6-24	<i>c.</i> 340	Inward-facing spur at head.
South quay . . .	<i>c.</i> 8	<i>c.</i> 950	..
Centre quay . . .	<i>c.</i> 9	<i>c.</i> 580	..
North quay . . .	6-8	<i>c.</i> 2,000	Broken in centre by two jetties forming Porto di Buffoluto. Three small jetties at north-east end, in basin formed by north-east mole.
North-east mole . . .	9-14	<i>c.</i> 450	Parallel to shore <i>c.</i> 250 ft. off, forming a rectangular basin with north-east end of north quay.

Facilities. As a whole the port is very poorly equipped with cranes, for there are none in Porto Mercantile, and only three on the quays of the Mare Piccolo. There are, however, travelling cranes in the dockyard, and tower cranes in the Tosi yard and in the seaplane basin. The normal number of floating cranes is 6, with 9 sheerlegs of 12- to 160-tons capacity. All the quays of Porto Mercantile are well supplied with warehouses, The naval dockyard has several, including a cold store whose capacity is stated to be rather more than 1,000 tons of meat.

The main coal wharf is the Calata Carrieri north-east of the dockyard. There are no handling facilities as yet and supplies are dealt with by lighters. A stock of 4,000-5,000 tons is normally maintained. Very considerable quantities of oil are held in the port (Appendix II). There is possibly a small commercial store of packed oils kept by SIAP west of the root of the Molo di Ponente in Porto Mercantile, but all other supplies are naval, in five groups, with pipe-lines on the Arsenal quay for fuelling ships, and from the 'T' jetty on Point della Penna, from the jetty at Il Fronte, and from the 'Y'-jetty in the Mare Grande. There are water-boats to serve ships anchoring in the Mare Grande or berthed in Mare Piccolo. The Molo di Ponente and the Molo di Levante of Porto Mercantile, and the Arsenal quay, are equipped with hydrants. Electric power is supplied to the dockyard, and there is probably lighting on the quays to its west.

All the repair facilities are at present centred in the western basin of the Mare Piccolo, where there are the yards in Borgo della Stazione, the Tosi yard, and the naval dockyard. The last does no building, but is capable of the simultaneous repair of 1 battleship, 1 cruiser, and 4 destroyers or submarines. The port's two dry-docks are in the naval dockyard: the new graving-dock on the east of the Mare Grande is about half complete and is estimated to be about 830 feet long and 140 feet wide.

Details of Dry Docks in the Naval Dockyard

	<i>Length on bottom ft. in.</i>		<i>Width of entrance ft. in.</i>		<i>Depth on sill ft. in.</i>	
No. 1 Dry Dock	672	6	107	0	32	4
No. 2 Dry Dock	807	2	131	2	39	4

(No. 1 can be used in two sections, 375 ft. 6 in. and 190 ft. long.)

Floating docks number 7 or 8 and vary in size from 170 feet by 40 feet to 600 feet by 115 feet. Slips total 13, of which 3 are just south of the Pontile del Genio Marina, 1 is in the naval dockyard, and 9 are in the Tosi yard. The largest is about 490 feet long by 60 feet wide, and the smallest about 164 feet long. All three areas have fitting-out berths, and the Tosi yard and navy yard in particular have extensive repair shops. The seaplane base has shops which could presumably execute some marine repairs.

The main railway station is north of Porto Mercantile in Borgo della Stazione. There are sidings on to the Molo di Ponente of Porto

Mercantile, on to the Pontile del Genio Marina, into the Tosi yard, and round the east basin of the Mare Piccolo to the seaplane base, the dockyard, and the Artillery quay. Exit by road is easy from the west of Porto Mercantile, but constricted by buildings on the east side of the basin. The naval port is shut in by buildings and a wall and there are but two exits, one at the west end of the destroyer wharf and the other south-west of the dockyard.

Trade and Connexions. The commercial trade of the port is not great, but in 1932 (the latest year for which figures are available) 471 ships totalling nearly 393,000 tons used the port. Imports, chiefly coal, phosphates, timber, grain, sugar, iron, and other building materials, totalled 151,196 tons, while the chief exports were cement, olive oil, fruit, wine, and shell-fish, which amounted to a mere 3,000 tons.

Taranto is a port of call on two of the Venice-Genoa coastal services, one every 10 days and the other every fortnight. There is thus connexion with the numerous sailings from Brindisi and Naples.

Inland Communications

Railways. Taranto is on the single-track line from Brindisi to Naples (double track, electrified from Battipaglia to Naples), from which the line to Reggio di Calabria branches off at Metaponto. Single-track lines also run to Bari via Gioia del Colle and via Martina Franca (Sud Est railway).

An electric tramway crosses the city from the station to the Arsenal.

Roads. Taranto is on road 7 (Via Appia) from Rome to Brindisi. Road 100 branches from road 7 north-west of Taranto for Bari and road 7-ter at S. Giorgio Sanico, east of Taranto, for Lecce. Other main roads lead to Martina Franca and Metaponto.

Airfields. There is an airfield on Cape S. Vito, 4 miles south of the city, and another about 7 miles north-east near Grottaglie. The seaplane station of Luigi Bologna is $\frac{1}{2}$ mile south-east of the torpedo range pier on the south shore of the Mare Piccolo.

GALLIPOLI. Latitude 40° 3' N. Longitude 17° 58' E. Population 12,818. Seat of bishopric.

Position and Site (Plate 29)

Gallipoli, situated about midway along the eastern shore of the gulf of Taranto, is divided into two parts. The compact old town, which is completely surrounded by walls, covers a kidney-shaped

island with a greatest length and width of about 500 yards. The island is bounded by rocks on the south, by a beach and the Seno di Ponente harbour on the west, by the main harbour on the north, and by the Seno del Canneto boat harbour on the east. The old town is connected by the Ponte Urbano (masonry; 12 arches; c. 100 yds. long) with the new town. This stands on a narrow peninsula which projects westwards towards the island and gradually narrows from a width of about 750 yards at its root in the eastern part of the town to about 250 yards at its head. The new town with its regular, wide streets laid out in a gridiron pattern forms a contrast to the old town, which is served by narrow winding roads and alleys.

History

Gallipoli, the Gallipolis or beautiful city of the Greeks, was taken by the Romans in 265 B.C. Although sacked by both Vandals and Lombards it remained under Byzantine rule until taken by the Normans in 1071. It became a centre of resistance to Charles of Anjou, and, when forced to capitulate to the Angevin forces (1269), thirty-three of the leading barons of the kingdom who were found in the Castello were executed. The city became rich and flourishing under Angevins and Aragonese, and aroused the cupidity of Venice, who besieged and occupied it for a few months in 1484. It was one of the few Neapolitan towns which held out against Charles VIII of France in 1495, and in recognition of its resistance to Francis I in 1528 the Emperor Charles V conferred on it the title of *fedelissima*. During the seventeenth and eighteenth centuries it was an important commercial centre. In 1809, when in French occupation, it was bombarded by an Anglo-Sicilian squadron.

Public Buildings and Monuments

All of the interesting buildings and monuments are in the old city. Near the Ponte Urbano is an ancient fountain with debased Greek reliefs. The Castello, built by Charles of Anjou, is a fine square building with round towers at each angle, one of which has fallen into the Seno del Canneto. The cathedral of Sta. Agata is in the baroque style and has an elaborate façade dating from 1696. There is a small Museo Civico.

Industry

Gallipoli is primarily a fishing-port, though it is also a small agricultural market. Industry is on a very small scale and is mainly

concerned with processing fish and agricultural products. Tunny fish is preserved, whilst pasta, olive oil, and sulphur oil are made.

Description of Port

The main harbour of Gallipoli lies north of the island on which the old town is built, and is protected on the north-west by the Molo Foraneo, recently lengthened by the narrower Molo di Tramontana. There are two small but well-protected boat harbours, one on the north-west of the island and the other to the east of the island, between it and the peninsula on which the new town stands.

Three islands lie west-south-west of Gallipoli, S. Andrea, Scoglio Campo, and Scoglio Piccioni. The first is nearly a mile off and the two last are about 250 yards away. They restrict navigation to the west of the port, and there is a shoal, the Secca Rafo, approximately 470 yards north-north-west of the head of the Molo di Tramontana. Apart from this, the approaches are unobstructed. Anchorage is north or south of the port according to the wind direction. The immediate approaches have a depth of 33 feet for a width of 750 feet south of the head of the Molo di Tramontana, and the harbour is accessible to ships up to 420 feet in length and of 21 feet draught.

The Molo Foraneo, lying south-west to north-east, is quayed, though irregularly, on the inside, and so is its north-eastward extension, the Molo di Tramontana. The former at its south-west end is connected to the northernmost point of the island by the Ponte per il Molo, and the north shore of the island is quayed in two lengths to the Ponte Urbano, the bridge connecting with the mainland. Under the larger arch of the former bridge there is access to the first of the two boat harbours, the Seno di Ponente. This is protected on the north-west and on the west and south by rubble breakwaters, the first of which is quayed on the inside. Through the arches of the Ponte Urbano small boats can reach the second boat-harbour, the Seno del Canneto. This is similarly protected by two rough overlapping breakwaters. There is a landing-pier on the east side of the Seno del Canneto and a repair slip to its east, as well as a hauling-up hard in the north-west corner near the Ponte Urbano.

Facilities. The Captain of the Port's office is close east of the Ponte Urbano and the customs-house is behind the west end of the quay to the west of the bridge, the Banchina della Ferrovia.

There is a naval storehouse on the Molo Foraneo, a warehouse immediately south of the Ponte per il Molo, and considerable storage space in the customs-house. There is, however, only one crane, a



PLATE 29. *Gallipoli*



PLATE 30. *Otranto*

3-ton hand-crane on the Banchina della Ferovia. Water is piped to the Molo Foraneo, which has 4 hydrants, and to the Banchina del Lido and della Ferrovìa, each of which have 3 hydrants. There is no bulk storage of either coal or oil.

Only small boats can be repaired. Of the two slipways that in the Seno del Canneto has been mentioned above; the other is at the tunny factory, about $\frac{1}{2}$ mile east-north-east of the Ponte Urbano.

The Banchina del Lido and the Banchina della Ferrovìa are both served by the railway which crosses the north side of the Ponte Urbano from the passenger station. Road traffic from the outer breakwater has to cross the Ponte per il Molo and then joins that from the two island quays to cross the Ponte Urbano directly into the Corso Roma.

Gallipoli is the headquarters of a large number of fishing-vessels engaged in the tunny fishing.

Trade and Connexions. There is little foreign trade. Normally the chief imports are coal, cereals, sulphur, and timber, and the chief exports olive oil, wine, dried figs, and tunny in oil.

The town is a port of call four times a month on the coastwise service from Venice to Genoa, on the two services which connect Genoa and Venice every 10 days, and fortnightly on the Fiume-Sicily-Genoa run.

Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
Molo Foraneo				
Western portion . .	10	230	..	..
Central portion . .	20 to 25	325	..	..
Eastern portion . .	10 to 13	390	..	Depth 23 ft. about 33 ft. off quay. Curving quay. End- on berthing.
Head	10	130	..	..
Molo di Tramontana	? 10	500	..	End-on berthing is usual. Depth 16 ft. about 45 ft. off quay.
Banchina del Lido . .	23	525	..	End-on berthing is usual. Single railway track in rear of quay.
Banchina della Ferrovìa .	13	550	1	Usually coasters, berthed end on. Two railway tracks branching from a single track.

Inland Communications

Railway. Single-track lines run to Lecce and to Casarano, the latter being a junction for Gagliano Leuca.

Roads. Road 101 goes to Lecce. There are secondary roads to Nardo, Maglie, and Sta. Maria di Leuca.

OTRANTO. Latitude 40° 9' N. Longitude 18° 30' E. Population 2,507. Seat of archbishopric.

Position and Site (Plate 30)

Otranto is at the head of a small bay on the Adriatic coast of the heel of Italy. The country around the bay is low, and to the west and south rises gradually in ridges to heights of over 300 feet, whilst on the north there is a coastal plain which is never higher than 165 feet. The walled town is built on a blunt projection fringed by low cliffs, whilst shallow valleys come down to the sea on either side where there are small beaches. The F. Idro, one of the few perennial streams in limestone Apulia, flows in the western valley. Both valleys are cultivated with vines, whilst the low intervening ridges are also intensively farmed. The streets of Otranto are for the most part narrow, and residential buildings, shops, and the main municipal buildings are rather crowded. Some villas are, however, scattered on the slopes of the eastern valley.

History

Otranto was the Roman Hydruntum and an important port of communication between Italy and Greece. Under the Empire, if not before, it enjoyed the right of coinage, and in the seventh century it became the seat of a Byzantine governor. The most dramatic moment in its history came in 1480, when it formed part of the Aragonese kingdom of Naples. Mahomet II sent his Grand Vizier against it with a fleet of ninety galleys and numerous smaller vessels, as a prelude to his design of overrunning all southern Italy. After a heroic resistance Otranto fell, and the Turks entered the cathedral, where they massacred the archbishop and all the citizens who had taken refuge there. King Ferrante collected an army for the city's rescue, but the siege went badly and it seemed as though the Turk might conquer Rome as well as Constantinople. Otranto was won and Italy saved by the death of Mahomet II; deprived of their great leader the Turkish resistance weakened, and in September 1481 Aragonese troops entered the city. Otranto was one of the Apulian ports which Ferrante II was forced to hand over to the Venetians in return for their help in driving the French from Naples (1496). They held it until 1509, and in 1537 another attack from the Turk

was successfully repulsed. After this its importance declined. In the war of 1915-1918 it became a useful Allied base, while its barrage blocked the entrance into the Mediterranean to the Austrian fleet.

Public Buildings and Monuments

The vast cathedral of the Annunciata is a Norman building founded in 1080. The crypt and the fine mosaic pavement both date from the twelfth century. After the Turkish outrage of 1480 the cathedral was restored and the beautiful rose window added by Archbishop Serafino di Squilace, whose Renaissance tomb is in the nave. The Castello, built by Alfonso of Aragon, has a place in English literature as Horace Walpole's *Castle of Otranto*. The Church of Sta. Maria dei Martiri is a Renaissance building which commemorates those citizens who were massacred by the Turks in 1480.

Industry

Otranto is a small agricultural centre and has no industrial establishments except for several small olive-oil presses.

Description of Port

Otranto lies at the head of its bay which opens north-east between Point S. Nicola on the south-east and Point Craul on the north-west. The only protective work required is the dog-legged breakwater extending north-west and then west-north-west for a total distance of 325 yards from Point S. Nicola.

The approaches are free from obstructions. Anchorage may be had east-north-east of Point Craul or, by small ships, south of the point and west of the breakwater. In the former case the holding is not good and ships are exposed to north-easterly and easterly winds. A rocky shoal extends from the head of the breakwater and another northwards from the town. The entrance to the harbour is a channel 130 feet wide between these two, leading to an area south-west of the breakwater dredged to a depth of $16\frac{1}{2}$ to 19 feet.

The only harbour works are a quay built out from the outer section of the breakwater, some rough quays with depths of 3 feet, and a pier projecting north-west for 140 feet from the north-west of the town. The breakwater quay is 280 feet long and about 6 feet high, with depths alongside of 16 feet. Vessels usually berth stern-to.

Facilities. The customs-house is 140 yards south-south-west of the root of the town pier. The port is almost entirely without facilities, for there are no cranes or fuel supplies and no storage space other

than the small amount offered by the customs-house. The only hydrant is at the root of the breakwater and available only to ships drawing less than 9 ft. 9 in. There is possibly a small slipway, but no repairs can be undertaken to other than very small craft. The railway station is a $\frac{1}{2}$ mile west-north-west of the town, and no lines serve the harbour area. A good road leads round the bay from the breakwater to the town, but the roads in the town are narrow and tortuous. The town shore-line is mainly backed by high walls, but there is fair exit south-west and then inland from the pier.

Trade and Connexions. There is some export of local agricultural produce to other Italian ports, but the harbour is little used and no calls are made by the regular shipping lines.

Inland Communications

Railway. There is a single-track line from Otranto to Maglie, a junction on the line from Lecce to Gagliano Leuca.

Roads. Road 16 goes from Otranto to Maglie to join the southern extension of road 16 to Cape S. Maria di Leuca. Another main road leads to road 16 via Martano, whilst a secondary road extends along the coast to Gagliano Leuca.

BRINDISI. Latitude 40° 39' N. Longitude 17° 56' E. Population 35,984. Provincial capital. Seat of archbishopric.

Position and Site (Fig. 23; Plate 31)

Brindisi, on the Adriatic coast of the heel of Italy, is built on the shores of a Y-shaped inlet leading inland from the Porto di Brindisi. The narrow stem of the Y is formed by the Canale Pigionati, which leads westwards before dividing into its two arms, the Seno di Ponente on the north and the Seno di Levante on the south-east. The fertile cultivated plain round the inlet is formed of sand and gravel, except on the north and east where there are tufa platforms which are often edged seawards by cliffs a short distance from the shore. Short streams flow across the sand and gravel plain into both arms of the inlet (I, Plate 29).

The main section of the city is on the low, almost square-headed, peninsula which separates the two arms of the inlet. The old, original part of the town to the north-west of the Corso Garibaldi and Corso Umberto I, the main streets, has narrow, congested roads and is the administrative quarter. The more modern residential part to the south of the main streets has in contrast wider and more open roads.

Capuccini, the newest residential suburb, is west of the railway station which limits the main part of the town on the peninsula. This suburb is laid out along wide tree-planted avenues. North of the Canale Pigonati and the Seno di Ponente is the residential suburb of Casale which contains the airfield. The most notable industrial district is on the eastern shore of the Seno di Levante.

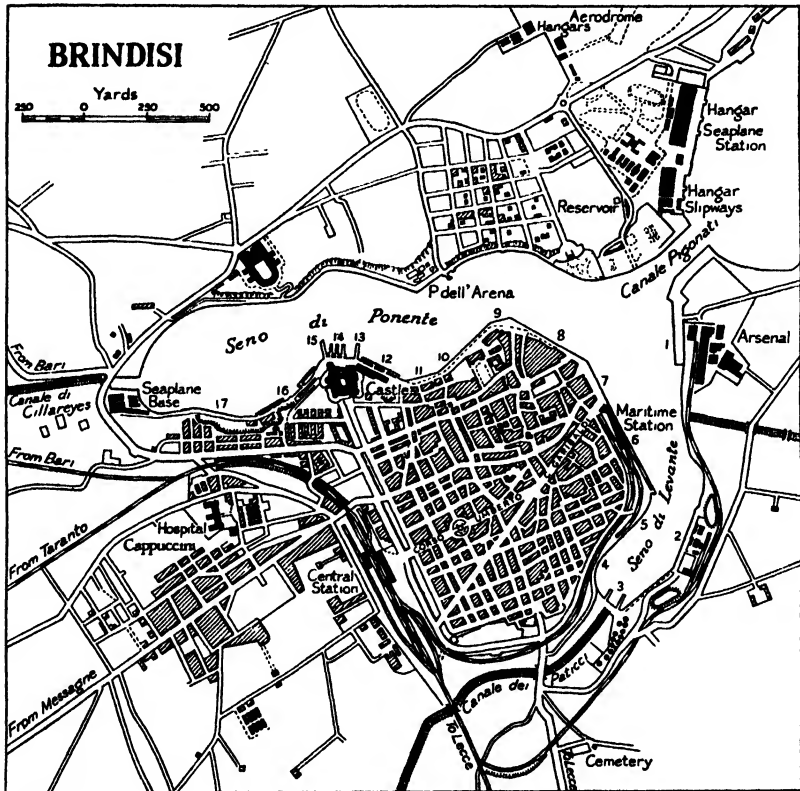


FIG. 23. *Brindisi*

History

Brindisi, known to the Romans as Brundisium, was an ancient city, possibly deriving its name from the Messapian word, *brunda*, meaning stag. The shape of the harbour resembles that of a stag's antlers, and a stag's head figures in the city's arms. Colonized by Greeks, its most flourishing period dates from 266 B.C., when it

became a Roman colony and municipium. Its magnificent harbour has made it in every age an important naval base and the connecting link between Italy and the East. From Brindisi military operations against Philip of Macedon were directed in the Second Punic War. Here the Via Appia terminated, and here in 49 B.C. Caesar besieged Pompey on his return from Greece, endeavouring to block the entrance to the harbour with piles as he had no fleet. No other city in Apulia is so rich in Roman remains. It suffered repeated assaults from Goths, Vandals, Lombards, and Saracens, and rose again under the Normans to become the chief embarkation port of the Crusades. Here, in 1225, the Emperor Frederick II married Yolande, daughter of John Brienne, afterwards Latin Emperor of Constantinople, and from hence Frederick set sail for Jerusalem in 1227. In 1406 it was occupied by Venice, as the price of the assistance she gave to the Aragonese kings against the French, and remained in her hands until 1509. With the shifting of the trade paths consequent on the discovery of the Cape route to India its prosperity declined, only to recover with the opening of the Suez canal in 1869. In 1775 the engineer Andrea Pigonati was employed by the Bourbon King of Naples to free the channel between the inner and outer harbours, and constructed the canal which bears his name. Extensive improvements in the port were carried out during the War of 1915-1918, and among the many naval operations for which Brindisi was used was the evacuation of the defeated Serbian army from the Balkan coast.

Public Buildings and Monuments

Facing the Canale Pigonati across the inner harbour are two Roman columns, said to mark the end of the Appian Way; one of these is intact and is decorated with figures of the classical gods, dating probably from the period of the Antonine emperors. The cathedral was built in the twelfth century out of the materials of a temple of Diana and Apollo, but was destroyed by an earthquake in 1743 and subsequently rebuilt. The little church of S. Benedetto was built by the Norman count Godfrey in 1080 and has a beautiful Romanesque cloister. The circular church of S. Giovanni al Sepolcro, dating from the eleventh century, is now the Museo Civico and contains inscriptions, mosaics, vases, and other classical antiquities. Frederick II built the Castello in 1227, using material from the amphitheatre and other Roman buildings. The Castello Rosso, on the island of S. Andrea, protecting the outer harbour, was built in

1481, to prevent a surprise attack from the Turks after their seizure of Otranto.

Industry

Brindisi is one of the principal Adriatic ports for passenger traffic and a secondary base for the Italian fleet. Industry is not of great importance. It is mainly concerned with the agricultural products of the very fertile surrounding region and specializes in wine-grapes and water-melons. The Montecatini chemical factory produces fertilizers and copper sulphate for vines. Wine barrels are made, and there is a notable distillery as well as olive-oil presses and pasta factories. The naval shipyard is mainly for repairs, whilst the aircraft factory builds civil aero-engines.

Description of Port

The port of Brindisi is the best anchorage for large craft on the Adriatic coast of Italy. It has a considerable passenger and transit trade and is an important naval base. The whole port is under the control of the naval authorities.

The harbour has three parts: from east to west, an exposed roadstead, the Avamporto; a sheltered outer harbour, the Porto Esterno; and a land-locked inner harbour with two arms. One of these arms, the Seno di Levante, trends south to the east of the town and is the main commercial harbour: the other, the Seno di Ponente, extends about 1 mile westwards along the north of the town, and its inner half is reserved for the navy.

The Avamporto faces north and the approaches and entrance are clear. It is contained on the east by the Pedagne rocks and the breakwaters joining them to each other and to the mainland to their south, and on the west by the islands of S. Andrea and Castello a Mare and the two breakwaters to their south, between which is the entrance to Porto Esterno. The anchorage is exposed to the north: the breakwater at the north-east corner of the island of S. Andrea was designed to give protection from this direction, and another is planned eastwards for the same purpose. A small jetty on the west side of Pedagna Grande is the only facility in the roadstead. Ruling depths are between 40 feet and 60 feet, shoaling eastwards and southwards. The passage westwards into the outer harbour is 900 feet wide with depths of 33 feet.

This outer harbour, the Porto Esterno, is protected on the east by the western islands and breakwaters of the Avamporto. An old

entrance from the north to the west of S. Andrea has now been completely closed by a breakwater joining the island to the mainland. In the northern portion, the Seno Bocche di Puglia, west of the islands, anchorage is prohibited, but elsewhere there is good holding in depths of about 30 feet. S. Andrea has the quarantine station, and Castello a Mare, to which it is joined by a bridge, is completely occupied by the Forte Castello a Mare, on whose western side is a well-protected boat camber. The western shore of Porto Esterno is developed with hangars, quays, and slipways for naval and commercial seaplanes.

The passage to the inner harbour, the Canale Pigionati, leads from the south-west corner of Porto Esterno. It is 600 feet long and 328 feet wide, with a least depth of 32 feet and quayed sides. The Seno di Levante is about $\frac{1}{2}$ mile long and 200 yards wide with depths of 33 feet to 26 feet along the centre. On the east shore there is a quay at the north end serving the Montecatini chemical works, as well as quays at the south end. At the head of the arm are two oiling piers for the tanks behind. The whole of the western shore has quays and towards their northern end is the Stazione Marittima. These quays and their extension round the east end of the Seno di Ponente are the principal commercial quays of the port. The Seno di Ponente is about 250 yards wide with depths of 30 feet to 33 feet, decreasing towards the head. Midway along the south shore is the Castello, which was the naval headquarters. Below its walls there are three piers and a mole for destroyers and submarines, and the quays on either side have offset wharves for naval craft. Towards the western end of this arm and on the south side the port's two floating docks are moored. At the head the mouth of the Canale di Cillareyes has been widened to form a basin in connexion with the seaplane station on its south side. The north shore is shoal and not quayed except at the east end, where, immediately inside the Canale Pigionati, is the naval coaling wharf.

Quay heights are exceptionally low. They average from $3\frac{1}{2}$ feet to 4 feet, and since depths alongside are usually considerably less than at a short distance off, transhipment pontoons are frequently used for vessels unable to berth alongside.

Facilities. The Banchina della Dogana has both the Captain of the Port's office and the customs-house. The Health office is just to their south in the Stazione Marittima.

The port is very poorly equipped with cranes, for the only ones are the 4 (?) on the Nafta quay and 3 for the use of the navy below

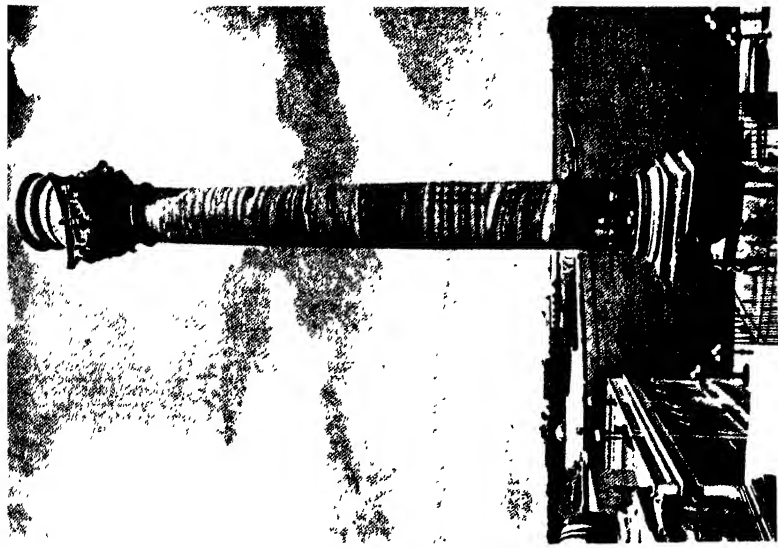


PLATE 31. *The end of the Via Appia at Brindisi*

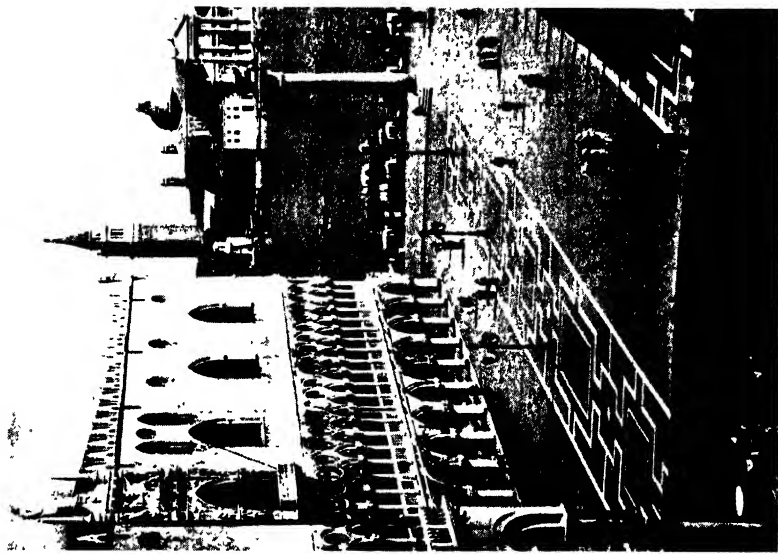


PLATE 32. *Venice: the Piazzetta S. Marco*

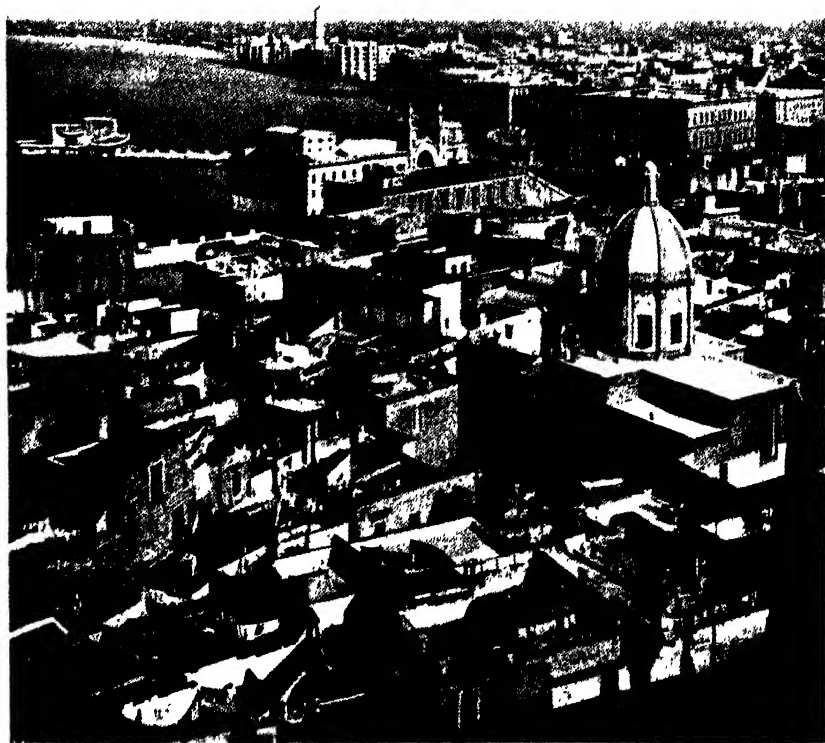


PLATE 33. *Bari*

the Castello. The floating equipment consists of 2 cranes, one of 40 and the other of 100 tons, and 1 large and 1 small sheerlegs.

There are no warehouses other than the buildings of the Stazione Marittima.

The naval coal supplies are held on the quay immediately west of the Canale Pigionati. There are no handling facilities. Some coal is stacked on the east side of the canal at times, and this may be the commercial supply, since the old bunkering station on the Banchina Carbonifera disappeared with the briquetting plant when that quay was realigned. There are no commercial stores of oil. The naval supplies are stored in the tanks at the head of the Seno di Levante and in some small tanks on the west and inside the walls of the Castello. Pipe-lines run out along the two piers by the former tanks, and vessels are also oiled at the quay to their east (Appendix II). Water supplies are abundant and good. There are nearly a score of hydrants on the commercial quays, and water-boats are available. The port is well lit by electricity.

Most vessels are sent to Taranto for repair, and so the port has few repair facilities. There is a slipway on the west of Porto Esterno, but it has apparently not been in use for some time. The two floating docks in the Seno di Ponente are 365 feet long and 65 feet wide: the lift of one is 2,000 tons and of the other nominally 4,800 tons.

The railway station is to the west of the town. The harbour branch leaves the main line to its south and curves round the south of the town along the west shore of the Seno di Levante to the Stazione Marittima. A single track with loops now continues to the Banchina Sciabiche in the east of the Seno di Ponente, and a line has recently been constructed along the east side of the Seno di Levante to the Montecatini works. The quays of the naval port and of the commercial port have frequent access to the roads leading into the town, but the roads are narrow. South of the Stazione Marittima a wide road follows the railway line, and the quays are open to it.

Trade and Connexions. Brindisi is more concerned with passenger and mail traffic than with goods. In 1939, 1,370 ships totalling 2,467,000 tons used the port, 125,000 tons of goods were landed, and 39,000 tons loaded. Of the imports, coal and coke accounted for more than half the total, with phosphates, cereals, and timber following. Other imports are oil, both mineral and vegetable, scrap, wool, machinery, fruit, cattle, and chemicals. Exports consist mainly of olive oil, wine, and agricultural products.

No.	Name	Depth alongside (feet)	Length (feet)	Facilities, &c.
<i>Seno di Levante</i>				
1	Eastern Shore (N.-S.) Banchina S. Apollinare	30	720	Quay for Montecatini chemical works.
2	Banchina di Nafta: Northern portion Southern portion	23 16½	740 650	....
3	Oiling piers: South-eastern North-western	.. .. ..	.. 175 130	Naval fuelling. Depths at head respectively 23 ft. and 11 ft. Vessels berth alongside outer portion.
<i>Western Shore (S.-N.)</i>				
4	Banchina di Levante	4½	650	Slightly curved.
5	Banchina Carbonifera	16½	640	..
6	Banchina Stazione Marittima	24½	600	Passenger and mail steamers.
7	Banchina della Dogana	24½	500	Captain of Port's office and customs- house behind.
8	Banchina Centrale	26	1,100	..
<i>Seno di Ponente (E.-W.)</i>				
9	Banchina Montenegro	16	265	..
10	Banchina Sciabiche: Eastern portion Western portion	.. 23 13	.. 500 275	......
11	Flotilla quay	c. 10	400	Naval port westwards from and including this quay.
12	Flotilla wharf . .	..	500	Offset wooden wharves. Stern-to berths for destroyers.
13	Torpedo pier . .	7½-22	200	Torpedoes and submarine accumu- lators. Berthing alongside outer portion. Two small travelling cranes. Decauville track to Castello at rear.
14	Three submarine piers	11-27	164	Transverse connecting roots.
15	Naval jetty . .	13-30	200	Travelling cranes on Decauville track.
16	Naval wharf: Eastern portion Western portion	c. 10 c. 10	260 360	Offset, stern-to berthing. Offset, stern-to berthing.
17	Coaling Wharf	18-23	c. 1,000	In three legs. Coal, for naval craft only.

Like Bari, Brindisi is a port of call for most of the Adriatic services from Venice, Trieste, and Fiume, many of which call at Split (Spalato). The following are the principal sailings: weekly to the Dalmatian coast ports and Albania, to the Piraeus, Smyrna, and Rhodes, to the Piraeus and Istanbul, and to Rhodes, the Levant, and Beirut; fortnightly to southern Italy, Sicily, Sardinia, and Genoa, to the Piraeus, Rhodes, and Alexandria, to the Aegean

islands, Rhodes and Alexandria, to the Piraeus, Crete, Alexandria, and Palestine (two services), to Cyprus and Alexandretta, to the Piraeus, Salonika, Istanbul, and the Danube ports, to the Piraeus, Smyrna, Istanbul, and Bulgaria, to Port Said, Massawa, and Djibouti, and to Port Said, Bombay, Colombo, Singapore, Manila, Hong Kong, and Shanghai; and monthly to Port Said, the Red Sea ports, Bombay, Karachi, and Basra, to Port Said, the Red Sea ports, Colombo, and Calcutta, to Sicily, Port Said, Aden, east, south, and west Africa, to Morocco, Spain, Naples, and Genoa, to Port Said, the Red Sea ports, Karachi, Bombay, Colombo, Singapore, Batavia, Saigon, Hong Kong, Shanghai, and Yokohama, and to Madras, Calcutta, and Rangoon. These services have many additional intermediate ports of call.

Airways. There are two seaplane stations; one at the west end of the Seno di Ponente, the other immediately north of the outer entrance of the Canale Pigionati. Brindisi was a calling-place on the Trieste-Syracuse route and for Imperial Airways. The airport is about 2 miles north of the city and was a calling-place on the Rome-Athens-Haifa-Baghdad-Basra, and Rome-Tirana-Salonika-Sofia-Athens-Rhodes routes. There is another airfield about 6 miles west of Brindisi.

Inland Communications

Railways. The Stazione Centrale is on the main Adriatic coast line from Rimini to Foggia and Lecce, and is the junction for the single-track line to Naples via Taranto. Brindisi Marittima is connected by a branch with the central station.

Roads. Road 7 (Via Appia) goes from Brindisi to Rome, and road 16, the Adriatic coast road from Padua to S. Maria di Leuca, passes through the city.

MONÓPOLI. Latitude $40^{\circ} 57' N$. Longitude $17^{\circ} 18' E$. Population 18,092. Seat of bishopric.

Position and Site

Monopoli is built beside several low, rocky indentations of the Adriatic coast of Apulia. It is the southernmost of the evenly spaced coastal towns which continue north-westwards to Barletta. Behind Monopoli gentle slopes, covered with olive groves and fruit orchards and trenched by small dry valleys, lead inland to the Murge scarp, about $4\frac{1}{2}$ miles away. The old part of the town is built on a rocky

headland, which together with an artificial mole forms the south-eastern side of the harbour. The old town, which is very compact and almost circular in shape, is bordered on the seaward side by steep masonry walls. There is no central open area, and the buildings are very closely spaced along narrow streets. The modern town is to the west of the old and is rectangular in shape. Its streets are broad and open and are laid out in blocks on a gridiron pattern. The main industrial section of the town is farther north, beside the indentations forming the northern part of the harbour.

History

Monopoli is an ancient city, but its history lacks distinctive features. In the fifth century A.D. it had a colony of Byzantine officials and merchants whose influence served to spread and maintain Greek civilization. It is to-day a place of considerable regional importance.

Public Buildings and Monuments

The cathedral was founded in 1107, but was completely rebuilt in the eighteenth century. It contains some good pictures, chiefly of the Venetian school. More interesting is the basilica of Sta. Maria Amalfitano, founded in 1059 by sailors from Amalfi as a votive offering after their rescue from a storm at sea, but this too has been disfigured by baroque additions. The Castello was built by Frederick II and restored by Charles V. Some 2 or 3 miles outside the city is the ancient abbey of S. Stefano, a Benedictine foundation of 1088, later a crusading hospital under the care of the Knights of St. John of Jerusalem.

Industry

Monopoli is the port for a very fertile agricultural district growing olives, wine grapes, almonds, citrus fruit, carob beans, and early vegetables. The principal industries of the town are connected with the processing of these goods, the pressing of olives, and the manufacture of sulphur oil and soap being particularly notable. The S.A. Gaslini has a factory for refining olive oil and sulphur oil for the soap industry. Packing-cases for fruit and vegetables, and casks, corks, and other auxiliaries for the wine and oil trade are manufactured. There are also pasta factories, flour mills, and a fair-sized cement works.

Description of Port

The small harbour of Monopoli has been formed by two moles, the northern of which overlaps the southern so that the entrance faces south-east. The approaches are free from danger.

The northern protective mole, the Molo Nord, is built in two legs east-north-east and then east-south-east from the shore. It is 628 yards long and is rough-faced on the north side. Although the inside is quayed, shallow water and loose boulders make it unsuitable for berthing, and it is only used by tankers discharging stern-to at the two oiling jetties. These are on the outer leg and are connected by pipe-line along the mole to the refinery at its root. The southern mole, the Molo Margherita, is also rough-faced on the outside and slightly dog-legged. It is 230 yards long, and the inner side, which is quayed, offers limited berthing to ships drawing less than 11 feet. The quay is about 6 feet high. The entrance to the harbour is between the heads of these two moles and is 585 feet wide with depths of 36 feet. There are depths of 22 feet in the area south-west from the entrance to the main quay, the Banchina della Solfatara.

The western inner shore of the harbour is formed by four creeks, from north to south, the Cale Curatori, delle Fontanelle, delle Batterie, and del Porto. The Cala Curatori is shallow, although the approach is deep. The south side has recently been filled in and an irregular quay built, east-north-eastwards to the north of the cement works and south-south-east towards Punta del Trave, with a short pier at the angle. The Cala delle Fontanelle, the largest of the coves, is backed by an embankment on which runs the road serving the oil refinery to its north. In the north-west corner two short opposing jetties form a small camber, and on the west shore below the embankment is a hauling-up hard. The Cala delle Batterie is shallow at its head, but its south side is the north-western face of the Banchina della Solfatara. The north-western quay has a length of 203 feet and a depth of 17 ft. 3 in. alongside, whilst the north-eastern face is 328 feet long with depths of 26 ft. 6 in. alongside. Both quays are about 7 feet high. The southernmost cove, the Cala del Porto, is shallow, and houses crowd right to the water's edge on the eastern and southern sides.

Facilities. The office of the harbour authority is on the north shore of the Cala delle Batterie, and the customs-house at the head of the Cala del Porto. There are no cranes and no warehouses. No stocks of coal are held, but S.I.A.P. (Appendix II) have an oil depot at the root of the Molo Nord, from which there are pipe-lines to the two

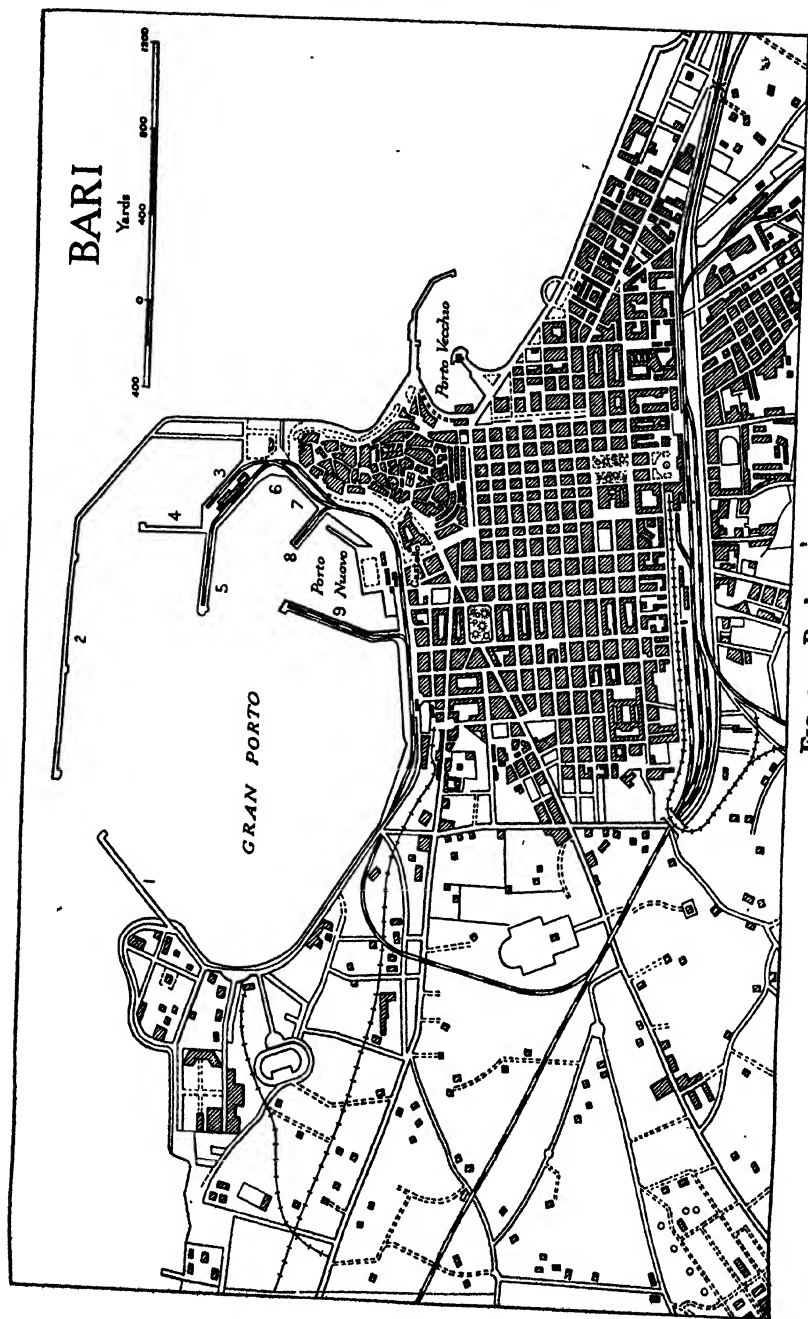


FIG. 24. Bari

jetties on the mole. The Banchina della Solfatara has five hydrants, and the water supply is plentiful. There are no repair facilities.

The harbour area is not served by the railway. A wide road leads into the town from the western corner of the Banchina della Solfatara, and from the root of the Molo Nord, but exit from the Molo Margherita is narrow.

Trade and Connexions. The chief imports are normally mineral oil, coal, grain, cattle, timber, and sulphur, and the main exports vegetable oil, dried fruit, lime, and cement.

Two services linking Genoa and Venice every 10 days call at the port.

Inland Communications

Railway. Monopoli is on the main Adriatic coast line from Rimini and Foggia to Lecce.

Roads. Monopoli lies between Bari and Brindisi on coast road 16. There are secondary roads to Conversano, Castellana, and Alberobello.

BARI. Latitude $41^{\circ} 8' N$. Longitude $16^{\circ} 51' E$. Population 162,238. Provincial capital. Seat of archbishopric. University. Chamber of Commerce. British Vice-Consul.

Position and Site (Fig. 24; Plate 33)

Bari lies to the south-east of a small semicircular bay formed between Point S. Cataldo on the west and the headland on which the old city with its castle is built on the east. Inland the intensively cultivated and densely populated country slopes gradually up to the Murge tableland, whilst a number of dry valleys or gravina come down to the coast near the city. Like most Apulian ports, Bari is divided into old and new towns. The old, on the eastern headland, is most congested and has very narrow thoroughfares. The modern town, south, south-west, and south-east of the old, has wide streets laid out on a gridiron pattern. The majority of the industrial establishments are in the southern and western outskirts of the new town.

History

Bari, traditionally founded by the Illyrians, was civilized by the Greeks and became an important commercial centre under the Roman Empire. From the sixth century until its conquest by the Normans in 1071 it was subject, not without interruption, to the Byzantine

emperors. In 730 it threw off the imperial rule and was for a time an independent duchy under Lombard protection. From 842 to 870 it was occupied by the Saracens and liberated, after a four years' siege, by the western Emperor Louis II. Restored to the Byzantines it became the seat of the Catapan, or Governor, of Apulia. The fall of Bari, in 1071, marked the end of Byzantine power in Italy, but the predominatingly Greek character of the city made it restive under Norman rule. In 1155 it was one of the cities which opened its gates to an invading army from Constantinople, and was punished for its rebellion by the Norman King William I, who reduced it to ruins. It was rebuilt and restored to prosperity by Frederick II. The first crusaders set sail from Bari in 1096, and in 1098 Urban II held a council there, in which St. Anselm of Canterbury took part in condemning the doctrine of the Eastern Church. Having passed to various lords under the Angevin kings, it was given by Ferrante of Aragon to the house of Sforza. Ludovico Sforza was Duke of Bari before his accession to the duchy of Milan, and after the French conquest of Milan, Isabella, the widow of Gian Galeazzo Sforza, herself an Aragonese princess, became Duchess of Bari. Here she held a brilliant court, and was succeeded by her daughter, Bona, who after the death of her husband, the king of Poland, spent her last years at Bari (1548-1557). On her death Bari passed to the Spanish rulers of Naples. The new town of Bari owes its origin to Murat, who laid the first stone in 1813, but it was little developed before 1840. During the War of 1915-1918 Bari was bombarded from both sea and sky, the most severe attack being the aerial bombardment of 24 May 1916.

Public Buildings and Monuments

The old city, situated on a headland, has some interesting medieval monuments. The cathedral of Sta. Sabina, begun in 1034, was almost entirely rebuilt after its destruction by King William in 1156, and has suffered a good deal from later restorations. It has to yield pride of place to the famous basilica of S. Nicola, which is the most important Norman church in Apulia and a popular place of pilgrimage. It was begun in 1087, on the site of the former palace of the Greek catapan, as a shrine for the body of St. Nicholas, which some sailors from Bari rescued from the Saracens. The majestic façade, the crypt containing the relics of the saint, an episcopal throne dating from 1098, and a Byzantine tabernacle over the high altar are among its notable features. The Castello, built by Frederick II on

the site of a Norman fortress, became in the sixteenth century the residence of the Sforza duchesses of Bari, who enlarged and embellished it (II, Plate 44). The much larger new town contains the Museo Provinciale and the university. Exhibition buildings are situated outside the city near Point S. Cataldo.

Industry

Bari is, after Naples, the most important commercial port in southern Italy and has a considerable foreign trade. This is because of its good position in a fertile region with which it has excellent communications. The city's industries are not so varied as those of Naples and are mainly concerned with the processing of food and especially of animal and vegetable oils. There are four large oil-refining plants in Bari, including those belonging to the large companies of S.A. Gaslini, Oleificio Ligure Pugliese S.A., and Olefici dell' Italia Meridionale. All these firms make olive oil, oil from residues, and sulphur oil, whilst Olefici dell' Italia Meridionale and Luigi Lonigro also make soap. Other firms have small soap factories. There are large flour mills, wine presses, distilleries for liqueur, tobacco, pasta, and canning factories, and other establishments for preserving and drying fruits, vegetables, and fish. The large A.N.I.C. mineral oil refinery and hydrogenation plant is the only one of its kind in southern Italy (Appendix I). Other industrial establishments include chemical, furniture, lamps and glass factories, and small textile mills, whilst several firms make casks and tin containers for wine, cardboard and paper boxes, and cartons. There are cement works and limestone quarries in the neighbourhood.

Description of Port

Bari is the chief commercial port of south-east Italy and is a port of call for many shipping lines. Recently there has been some development towards making it a naval base.

The old port (Porto Vecchio) lies on the east of the headland on which the old town is built. It is protected by the Molo S. Antonio on the north and by the Molo S. Nicola on the south, but is to-day used only by fishing-boats and pleasure craft, and is of little importance.

The new port (Porto Nuovo) lies north-west of the old town in the curve of the bay westwards to Point S. Cataldo. It is protected by a relatively new breakwater on the east and north, the Nuovo Molo Foraneo, and by the Molo Luigi Razza (formerly the Molo San

Cataldo) on the north-west. Within their protection and built on the west of the old town an inner and older harbour has been enclosed by two moles, the 'Y'-shaped Vecchio Molo Foraneo on the north and the Molo Pizzoli on the south-west.

The entrance to the outer harbour faces north-west and is 1,245 feet wide with depths of about 40 feet between the head of the Molo Luigi Razza and that of the Nuovo Molo Foraneo. The approaches are free of obstructions. Inside there are depths of 33 to 48 feet in the northern part of the outer harbour, but of less than 18 feet in the south. Anchorage is not good as the bed is rock.

The two outer breakwaters were built when development of the port became necessary and it was realized that to dredge the limestone bed of the old inner harbour would be too expensive and difficult. To-day, although the southern shore of the outer harbour is shoal and not quayed, the two breakwaters are not merely protective works. The Molo Luigi Razza is an oiling pier and has pipe-lines along it, while the whole of the Nuovo Molo Foraneo is quayed, and used regularly for berthing. As part of the planned development of this northern part of the port, its innermost leg is already being widened, there are quays to the west of its root, and the Molo Ridosso, the right-hand arm of the 'Y'-shaped mole already referred to, is the west side of the first of the four quayed jetties to be built on the north side of the Vecchio Molo Foraneo.

The entrance to the old, inner harbour is about 1,100 feet wide with depths of 27 feet between the Vecchio Molo Foraneo and the Molo Pizzoli. These two dog-legged moles are quayed, as is the eastern shore and the Pontile S. Vito at its southern end. Midway between this jetty and the Molo Pizzoli to its west is a block-setting yard with a quayed frontage: to the west of this last is a repair yard, while to its north-east a new quay appears to have been planned to the root of the Pontile S. Vito. The quay wall is, however, only half finished and the filling in not started. Although ruling depths on the north are from 21 to 27 feet, only small- to medium-sized vessels can be accommodated in the inner harbour.

Quays are 5 feet high in the outer harbour, 6 feet high on the inside of the Vecchio Molo Foraneo, and $4\frac{1}{2}$ feet high elsewhere in the inner harbour. Alongside berthing is possible on all quays, and is the usual practice in the outer harbour at any rate. The most fully equipped quays are those on either side of the inner leg of the Vecchio Molo Foraneo.

Facilities. The Captain of the Port's office and the customs-house

are both on the Banchina della Dogana, the quay to the north-east of the Pontile S. Vito.

No.	Name	Depth alongside (feet)	Length (feet)	Facilities, &c.
<i>Outer Harbour</i>				
1	Nuovo Molo Foraneo:			
	Northern outer leg	24-49	c. 3,000	Two abutments.
	North-eastern leg	c. 29	1,750	..
	Eastern inner leg	c. 34	1,400	Quay wall complete: only northern part filled in.
2	Molo Luizi Razza	16-26	c. 1,500	Two abutments near head, each 200 ft. wide. Tankers. Pipe-line to refinery.
3	Vecchio Molo Foraneo:			
	North-east side	c. 30-34	960+180	Three cranes. Quay 560 ft. long at south-east end eastwards to root of No. 2.
4	Molo di Ridosso:	c. 26	1,050	..
<i>Inner Harbour</i>				
5	Vecchio Molo Foraneo:			
	Outer arm . . .	14½	1,320	One crane and 2 grain elevators. Railway only along inner half.
	Inner arm . . .	18-30	1,350	..
	Quay south from root . . .	15	280	..
6	Banchina della Dogana	13	220+600	Customs-house and Captain of Port's office.
7	Pontile San Vito:			
	North-east side	c. 12	600	..
	Head . . .	15	90	..
	South-west side	c. 12	600	..
8	Cantieri S.I.C.A.M.	..	..	Block-setting yard.
	North face . . .	c. 5	650	New quay wall c. 500 ft. long at north-east end parallel to shore and about 140 ft. off.
	West face . . .	1-5	c. 300	..
9	Molo Pizzoli:			
	East side, . . .	..	..	Small shipyard at root.
	Inner leg . . .	2-5	280	Motor fishing vessels.
	Outer leg . . .	5-10	1,350	..

Bari is better equipped with warehouses than most south Italian ports, and the quays on the north-east, east, and south-east of the inner harbour all have storehouses. The Magazzini Generali is near the harbour station, west of the root of the Molo Pizzoli. With the possible exception of one small crane on the Molo Pizzoli, all the cranes of the port are on the Vecchio Molo Foraneo, which also has grain elevators. The cranes number 5 or 6, and are travelling jib cranes. A varying number of floating cranes, sheerlegs, and

pontoons has been seen in the harbour in connexion with the reclamation work.

A small stock of coal (c. 1,000 tons) is normally held, discharge being directly into and loading directly from railway wagons along the inner leg of the Vecchio Molo Foraneo. The town has an important oil refinery (Appendix II), and a pipe-line connects its storage tanks to the discharge points on the two spurs near the head of the Molo Luigi Razza. Water supplies are abundant, and hydrants are at 90-foot intervals on the Nuovo Molo Foraneo, the Vecchio Molo Foraneo, the Pontile San Vito, and the Molo Pizzoli. The piers and quays of the inner harbour are lit by electricity.

Only small ships can be repaired in the yard at the root of the Molo Pizzoli. There is a hauling-up hard in the yard, two similar hards for fishing-craft in Porto Vecchio, but no other repair facilities of any kind exist in the port.

The harbour station is west of the root of the Molo Pizzoli. It has a marshalling yard from which tracks continue eastwards round the inner harbour to the Vecchio Molo Foraneo with spurs on to the Molo Pizzoli and the Pontile San Vito. Westwards, the line to the Exhibition buildings skirts the southern shore of the outer harbour, and a line circles the west of the town to connect with the main station to its south. The Cantieri S.I.C.A.M. has a private light railway from the block-setting yard to its quarries. The terminus of the narrow-gauge line from Barletta is about 500 yards west of the harbour station. The quays have good road connexion with the main roads leading west and south inland, but the roadway on the Nuovo Molo Foraneo is narrow.

Trade and Connexions. Statistics of shipping are as follows:

	1938	1939
Ships entered, number	2,088	2,063
Ships entered, tonnage	1,606,000	2,066,000
Ships cleared, number	2,088	2,041
Ships cleared, tonnage	1,606,000	2,054,000
Goods landed, tons	348,000	466,000
Goods loaded, tons	155,000	262,000

The major imports are coal, coke, and mineral oil, which together accounted for nearly 60 per cent. by weight of the total, chalk and cement, wheat and flour, iron and steel, sugar, timber, fruit, vegetable oil, and textile fibres. The principal exports in the same year were chalk and lime, cement and gypsum, fruit, wheat and flour, olive-oil, coal, and mineral oil.

The passengers disembarking and embarking numbered respectively 12,474 and 8,185 in 1938, and 75,232 and 73,915 in 1939.

Most of the Adriatic shipping lines call at the port, as at Brindisi, on their way to or from Venice, Trieste, and Fiume. In addition, therefore, to local services daily to Durazzo, and weekly to Barletta, Manfredonia, and other ports northward to Tremiti, to Dalmatia, Fiume, Trieste, and Venice, and to Dalmatian and Albanian ports, Bari is a port of call on the weekly coastal service from Fiume to Naples, Genoa, Marseilles, and Valencia, and the fortnightly services from Fiume via Sicily and Sardinia to Genoa. There are further sailings as follows: fortnightly, to the Aegean islands, Rhodes, and Alexandria, to the Piraeus, Crete, Alexandria, and Palestine, to Cyprus, Alexandretta, Syria, Palestine, and Alexandria, to the Piraeus, Salonika, Istanbul, and the Danube ports, to Port Said, Massawa, and Djibouti, and to Naples and the Gulf of Mexico: and monthly, to Port Said, the Red Sea ports, Bombay, Karachi, and Basra.

Inland Communications

Railways. Bari is on the main Adriatic coast line from Rimini to Lecce, which is mainly single-track but has a double-track section between Bari and Molfetta. There are single-track lines from Bari to (1) Taranto via Gioia del Colle, (2) Taranto via Putignano and Martina Franca (Sud-Est Railway), and (3) Putignano via Cassamassima (Sud-Est Railway). A narrow-gauge line leads to Altamura where it divides for Matera and Montalbano Ionico and for Potenza.

Tramways. There are tramways from Bari to (1) Bitonto, Andria, and Barletta, (2) Carbonara di Bari and Ceglie (electric), and (3) S. Francesco dell' Arena, the principal bathing-beach of Bari (electric).

Roads. Bari is on the main Adriatic road, 16. Road 96 goes to Potenza, road 98 to Andria, and road 100 to Taranto. There are also secondary roads to Aquaviva and Cassano, as well as numerous local roads.

Airfield. The Principe Umberto di Savoia airfield is near the coast about 4 miles north-west of Bari.

MOLFETTA. Latitude $41^{\circ} 13'$ N. Longitude $16^{\circ} 36'$ E. Population 48,898. Seat of bishopric.

Position and Site

Molfetta is almost midway between Bari and Barletta on the Adriatic coast of Apulia. The fertile and cultivated country slopes

gently and evenly inland to the Murge scarp. The old and congested part of the town, almost square in shape, is built on a small headland on the east side of the artificial harbour. The more modern part of the town extends westwards round the indented coast of the harbour and southwards to the railway. The modern town is less congested and consists of blocks of houses dissected by wide streets generally at right angles. A number of isolated houses are scattered along the main roads round the town.

History

Molfetta was a centre of prehistoric life of which traces may be seen in the rock-dwellings of the great cave outside the city known as the Pulo di Molfetta. Its prosperity dates from the close of the twelfth century when it threw off the yoke of its Norman count and became immediately subject to the Hohenstaufen kings. The claim of the citizens to be independent of all but the Crown brought them into frequent conflict with their bishop, but they successfully vindicated their liberty throughout the Middle Ages. In 1522 the Emperor Charles V bestowed Molfetta as a fief on Ferrante of Capua, and in 1529 the city suffered partial destruction at the hands of the French general, Lautrec. Its next lord was Charles V's devoted servant, Ferrante Gonzaga, who had married Capua's daughter and heiress. It was held by the Gonzaga until 1640, when it was sold to one of the Doria family. Later it passed by marriage to another Genoese family, the Spinola, before it was included once more in the royal demesne. During the eighteenth century, in particular, it was a centre of culture and included some distinguished scientists and men of letters among its citizens. Unlike most south Italian cities it offered resistance to the armies of the French Republic in 1799.

Public Buildings and Monuments

The most interesting monument in the city is the Duomo Vecchio, a fine Romanesque building, dating from the second half of the twelfth century. Its basilica form, surmounted by three cupolas of varying size and shape, and the four great columns of the interior suggest both Byzantine and Arab influence. The Duomo Nuovo, in the new town, dates from 1773 and has an elaborate baroque façade. The beautiful fifteenth-century choir-stalls in carved wood were taken from the old cathedral. Near the sea-shore are the ancient Crusaders' Hospital and the church of Sta. Maria dei Martiri, consecrated in 1163 but retaining little of its original form.

Industry

Molfetta is a fishing and agricultural centre. The main industries of the town are concerned in processing agricultural products and fish. There are flour mills, pasta factories, and sulphur oil and soap factories, as well as establishments for processing fish, for making fish-nets, and a cement works. A boat yard undertakes repairs to fishing-boats.

Description of Port

Molfetta is a small but important fishing-port. The harbour is artificial and is formed by the East Mole, an irregularly shaped combination mole and jetty about 900 yards long, and by the West Mole (Molo di Ponente), a dog-leg mole, about 300 yards long. The safe entrance, which faces north-west, is 450 yards wide. Although the entrance has depths of 18 to 26 feet there is no space in the harbour for manœuvring vessels larger than the usual coastal or fishing-boats. Depths in the harbour are 12 to 25 feet at three mooring buoys and 3 to 24 feet at available wharf space along the quays. Vessels drawing more than 12 feet and more than 150 feet long should not proceed beyond the first mooring buoy, and vessels longer than 225 feet should not attempt to enter the harbour.

During fair weather anchorage in good holding ground is available at any point within a mile of the shore. The harbour is protected from all but the worst of north-westerly storms and forms a haven for the type of vessel customarily using Apulian ports. The inner part of the harbour is blocked by the Secca di S. Domenico (shoal of Saint Domenico), the outer side of which consists of exposed rocks. The harbour is subject to silting, but an area in the south-west corner between the Secca di S. Domenico and the south shore has been dredged to 32 feet.

The outsides of the moles are not accessible to vessels of any type. The inner side of the East Mole is quayed for 2,800 feet and its different lengths are named respectively from the shore end, the Molo S. Corrado, the Molo S. Michele, and the Molo Foraneo; depths alongside vary from 6 to 24 feet. The Molo di Ponente has a length of 590+230 feet and depths of 3 to 21 feet alongside. The Banchina S. Domenico, on the south side of the harbour, has depths of 5 to 11 feet of water alongside and lengths of 295, 705, and 213 feet. The Banchina Porto along the east side of the harbour has from 3 to 13 feet of water alongside and a length of 500 feet. The customs-house and Harbour Master's office are to the rear of this wharf.

Inland Communications

Railway. Molfetta is on the main Adriatic coast line from Rimini to Lecce. This is mainly single-track, but is double-track between Molfetta and Bari.

Roads. Molfetta is on road 16, the main Adriatic coast road. A secondary road leads to Corato and Gravina, whilst level roads serve the surrounding agricultural lands.

BISCÉGLIE. Latitude 41° 15' N. Longitude 16° 30' E. Population 32,552. Seat of bishopric.

Position and Site

Bisceglie is built at the head of a small semicircular bay on the Adriatic coast of Apulia. The fertile country slopes evenly from the low coast to the Murge scarp about 10 miles inland. The old commercial town, which is almost square in shape, is very congested and has narrow streets and alleys. The more modern town extends inland between the main coastal road and the railway, and is less congested and has wider streets.

History

Little is known of the origin or history of Bisceglie until the Norman conquest of Apulia, when it fell to one of the Hauteville brothers. Its prosperity depended less on its port than on the two fairs which were held there each year, in January and July. It became a fief of the del Balzo family, the last of whom perished in the baronial rising against Ferrante of Aragon (1487). It was then granted to Don Alfonso of Aragon, who became the second husband of Lucrezia Borgia, and for whose murder in Rome (1500) Cesare Borgia must be held responsible. He was succeeded by his son Rodrigo as Duke of Bisceglie. In 1639 the city won its liberty.

Public Buildings and Monuments

The Norman cathedral was founded in 1073, but a baroque window in place of the rose spoils the façade and the interior has been entirely reconstructed. There are some fine choir-stalls of the sixteenth century. The little church of Sta. Margherita, built in 1197, is a jewel of Romanesque architecture, practically intact. Here the tombs of the Falcone family, especially that of Riccardo (1220), are noteworthy. Three large towers are all that remain of the Norman castle.

Industry

Bisceglie is primarily an agricultural and fishing town with a number of small industries concerned with the processing of local products for domestic consumption.

Description of Port

Bisceglie, a small, modified natural harbour, provides a haven and landing space for the smaller type of fishing-vessel used on the Adriatic, but otherwise is of no commercial importance. Its small semicircular bay is protected by the East Mole, extending about 200 yards in a north-north-westerly direction from the eastern entrance point, and by the North Mole, which projects eastwards approximately 325 yards from about 250 yards north of the outer point of the East Mole. The harbour has a depth of 12 feet at the entrance and from 6 to 10 feet in the middle. The small craft using the port moor to quays, either at the sea-wall or along the moles, or to a bollard on the rock near the centre of the harbour. During times of low tide there is no usable water south of this rock. No anchorage space is available in the harbour.

Entrance from the Adriatic is free and clear of all obstructions. The mouth between the moles has a safe navigable width of 200 yards, and the opening between the end of the East Mole and the shore is 120 yards wide. Along the North Mole, 150 yards of the quay space have 12 feet of water, but most of the wharf space on the East Mole and on the South Quay along the head of the indentation has less than 2 feet of water at low tide. The type of fishing-boats generally used in the area can rest on the mud after docking at high tide.

Facilities are primitive but provisions and water can be had in quantities usual for small boats.

Inland Communications

Railway. Bisceglie is on the main Adriatic coast line from Rimini to Foggia and Lecce.

Roads. Bisceglie lies between Barletta and Bari on coast road 16. There are secondary roads to Andria, Corato, and Ruvo di Puglia.

TRANI. Latitude 41° 16' N. Longitude 16° 25' E. Population 29,962. Seat of archbishopric.

Position and Site

Trani is built round a small almost circular inlet on the Adriatic coast of northern Apulia, from which low country slopes gradually

inland to the scarp of the Murge plateau. The old town with its narrow lanes stands mainly on the headlands west and east of the inlet and round its head. The castle and cathedral are on the western headland. The newer town, which is almost rectangular in shape, has wider streets laid out on a gridiron plan to the south of the old, and extends to the railway. Beyond the main urban area scattered houses continue along the main roads especially south of the town.

History

Trani is first mentioned in a document of the third century A.D. under the name of Turenum. It came in turn under the sway of Byzantines, Lombards, and Normans, but enjoyed virtual independence. Pilgrims and crusaders brought wealth to the city, and it was frequented by Pisans, Genoese, and Venetians for purposes of trade. In the thirteenth century the Venetians had a resident consul in the city. The *Ordinamenta Maris* of Trani, traditionally ascribed to the year 1063, but probably of a later date, form one of the earliest maritime codes of the Middle Ages. Later Trani fell to various feudal lords and from 1496 to 1509 was occupied by the Venetians who rebuilt the port. The recovery of Trani, Brindisi, and Otranto was Ferdinand the Catholic's chief object in joining the League of Cambrai against Venice. In 1799 the merchants declared for the Parthenopean Republic, but the populace overthrew the Government and opened the gates to Cardinal Ruffo's forces. Trani was in consequence besieged and sacked by the French general Broussier. Until recently it was the seat of the Court of Appeal for Apulia, but this is now transferred to Bari.

Public Buildings and Monuments

The cathedral is one of the finest buildings in Apulia. It consists of a lower church of Sta. Maria, dating from the seventh century and supported by Roman columns, and an upper church, dedicated to the local saint, Nicola il Pellegrino, begun in 1094. The great bronze door has interesting reliefs, by the native sculptor Barisano (c. 1175), and the thirteenth-century campanile bears the name of its architect—*Nicolaus Sacerdos et Protomagister*. Other interesting churches are the Templar's church of Ognisanti, and the small basilica of S. Andrea, one of the oldest of its kind. The Palazzo Caccetta was built by a merchant of that name in 1458, and is in excellent preservation. It served for long as the seat of the Government and is now a seminary. The Castello is among the many which owe their origin to

Frederick II. In the Villa Comunale, or public gardens, are three milestones from the Via Traiana.

Industry

Trani is essentially an agricultural town and is the market for locally produced cereals, olives, fruit, almonds, and wine (*Moscato di Trani*). Most of the town's small industries are concerned with processing agricultural products, the manufacture of olive oil, sulphur oil, and soap being particularly notable. The local quarries and the fishing industry are both of some importance.

Description of Port

The port of Trani is a small natural bay protected by two moles and a breakwater. The Molo S. Antonio, extending in a north by westerly direction, and the Molo Sta. Lucia, extending in an east by southerly direction, enclose the port on the east and west respectively. The opening between them has a width of about 300 feet and depths of 13 feet between shoals. The breakwater, Braccio di S. Nicola, with its base about 500 feet north-west of the Molo Sta. Lucia, extends about 1,000 feet in a north-easterly direction. None of the moles and only two sections of the sea-wall on the west side of the port are quayed and accessible to commercial boats. These are the Banchina Sta. Teresa, 480 feet long with 12 feet of water, and the Banchina Sta. Lucia, 185 feet long with 7 feet of water. Depths are maintained by dredging. Facilities are either lacking or primitive. Vessels regularly using the port are coastwise steamers in the Italian coastal and inter-coastal trade, and fishing craft of 5 to 50 tons of the type usual to the Adriatic. Vessels may anchor off the entrance.

Inland Communications

Railway. Trani is on the main Adriatic coast line from Rimini to Lecce.

Roads. Trani lies between Barletta and Bisceglie on the Adriatic coast road, 16. In addition to local roads, a main road leads to Corato and a secondary road to Andria.

BARLETTA. Latitude 41° 19' N. Longitude 16° 16' E. Population 51,597. Seat of archbishopric.

Position and Site

Barletta is on the Adriatic coast of Apulia where the sandy beach fringing the Tavoliere di Puglia begins. Low country slopes gently

inland to the scarp of the Murge plateau immediately south of the city, whilst to the north-west beyond the F. Ofanto stretches the low Tavoliere di Puglia. The old town with its narrow lanes and castle is mainly south of the artificial harbour, though it continues westwards behind the wide bathing beach. The more modern part of the town, which has wider and less congested streets, extends to the south of the old and continues beyond the railway station. The main industrial establishments are in the eastern suburbs.

History

Barletta is of Roman origin, but its importance dates from the Norman period. The Emperor Frederick II held a parliament of his barons here in 1228, and named his son Henry as his successor before going on crusade. It was the favourite residence of Manfred, and Charles of Anjou set up a mint in the city which coined the first gold *regali*. Ferrante of Aragon had himself crowned King of Naples here in 1459 when he was struggling to secure the throne against the Angevin claimant. In the war between France and Spain over Naples (1502-1503) the great Spanish captain Gonsalvo was besieged for nearly a year in Barletta, before he emerged in the spring of 1503 to inflict a decisive defeat on the French. An incident of the siege was the famous *Disfida di Barletta*, when thirteen Frenchmen and thirteen Italians met in combat. The gauntlet was thrown down by a French captain, La Motte, a prisoner of the Spaniards, who at a banquet in Barletta made disparaging remarks on the military qualities of the Italians. The leader of the Italians was Ettore Fieramosca, who gives his name to d'Azeglio's novel on the subject, and the combat took place near the city after La Motte had bought his liberty. It ended in complete victory for the Italians, one Frenchman being killed and the other twelve surrendering. In 1528 Barletta was taken by the French general Lautrec and partly destroyed. This, together with earthquakes (1689, 1730) and a visitation of plague (1657), ruined the prosperity of the city, and it did not recover until modern times.

Public Buildings and Monuments

The cathedral of Sta. Maria Maggiore is a fine Norman building which was begun in the first half of the twelfth century and lengthened eastwards in the fourteenth century. Over the left portal of the façade is an inscription recording that this doorway was built at the expense of Richard I of England, whose sister Joan married King

William II (1176). A panel painting signed by Paolo Serafini (1387) is known as the Madonna della Disfida, because it was carried out to meet the victorious Italians returning from their combat with the French (1503). Normans, Hohenstaufen, and Angevins all contributed to the building of the massive Castello, which stands behind the cathedral near the sea. The four corner bastions were added under Charles V (1532-1537). Other monuments of interest are the great Cistercian church of S. Sepolcro, dating from the twelfth century, and S. Andrea, with a Byzantine portal and a Madonna and Child by Alvise Vivarini (1483) which points to the prevalence of Venetian influence in Apulia at this period. The fourth-century colossal statue of a Byzantine Emperor in bronze outside S. Sepolcro is an excellent example of a form of sculpture which became popular during the declining years of the empire. The Pinacoteca De Nittis contains works by a local nineteenth-century painter of that name.

Industry

Barletta's industries are primarily agricultural as the city is in a very fertile region. The manufacture of olive oil, sulphur oil, and soap are particularly notable; the large firm of Olefici Meridionale has factories for olive oil and sulphur oil. Wine, and especially brandy, are made in the city and district, and the latter is exported into France and distributed throughout Italy. The chemical industry is important, a Montecatini factory producing artificial fertilizers, and the L'Appula works industrial chemicals, including cream of tartar made from wine lees. Casks and barrels are made for the oil and wine industry, whilst there are several saw-mills. Natural cement is made near the city.

Description of Port

The harbour of Barletta lies north-east of the town and is formed by a curved breakwater, 4,400 feet long, on the east, which overlaps an irregular mole roughly $\frac{1}{2}$ -mile to the west, built northwards and north-eastwards in four legs from a slight promontory. The approaches are free of danger. The entrance to the harbour, facing north-west, is approximately 650 feet wide with depths of 20 feet. Inside, there are depths of 18 feet or more only within 600 feet of the northern half of the west mole; the south and east is shoal.

The east breakwater, the Diga di Levante, is not quayed. The whole of the shore and of the inner side of the western mole have quays, but those of the former have too shallow water to be much

used. The western mole consists of three parts: the inner part is the Molo di Ponente and is 1,500 feet long in a north-north-west direction with a broad jetty, the Sporgente Capitaneria, projecting about 420 feet at right angles to its east side near the root; the central part, the Molo Centrale, is 700 feet long and runs east-north-east at right angles to the Molo di Ponente; the third part is the dog-legged Molo di Tramontana, extending 700 feet to the north-east and then 800 feet to the east-north-east. The inner leg, broader than the outer, is offset at its junction with the Molo Centrale. These quays give a total length of 2,500 feet of berthing space with depths from 16 to 27 feet, but the longest single stretch is only about 700 feet.

Facilities. The office of the harbour master is at the base of the Sporgente Capitaneria. The harbour is reported to possess cranes and warehouses, but details are not known. Coal is only obtainable in very small quantities, but there are 4 oil tanks (Appendix II) on the harbour front midway between the mole and the breakwater. Water is piped to the quays and is abundant. Repairs to vessels up to medium size can be carried out by the Graziani works, which have shops, a foundry, and a patent slip on the Sporgente Centrale. A branch line leaves the main railway nearly $\frac{3}{4}$ mile east of the station, curves north round the east side of the town, passes along the water front and out on to the whole length of the west mole. The road which serves the harbour area roughly parallels the railway and connects with roads leading into the town and inland.

Trade and Connexions. The imports and exports are similar to those of most other south-east Italian ports, the former consisting mainly of coal and mineral oil, timber, cereals, charcoal, sulphur, and sulphate of copper; the latter of wine and wine casks, olive oil, acids, salt, and cement.

Barletta is a port of call on the fortnightly coastal service from Fiume to Genoa and on the weekly services from Bari to Venice and Manfredonia.

Inland Communications

Railways. Barletta is the junction of the main Adriatic coast line from Rimini to Lecce, for the single-track line to Spinazzola. There is also a tramway to Bari via Andria and Bitonto.

Roads. Barletta is on the main Adriatic coast road 16 and on road 93 to Potenza. A main road leads to Andria and secondary roads to Foggia and Manfredonia.

Airfield. There is a landing-ground to the west of the city.

MANFREDONIA. Latitude $41^{\circ} 38'$ N. Longitude $15^{\circ} 55'$ E. Population, 18,787. Seat of archbishopric.

Position and Site

Manfredonia, at the head of the gulf of Manfredonia, is built on the narrow north-eastern extension of the low Tavoliere di Puglia where it adjoins the mountains of the Gargano peninsula. These mountains rise precipitously from the plain about 3 miles behind the town and reach heights of 2,900 feet about 5 miles inland. The beach-fringed plain is undulating immediately south-west of the town, but 6 miles away becomes low and swampy.

Manfredonia is rectangular in shape and very compact, being surrounded by walls which also enclose a fine medieval castle in the north-eastern corner of the town. The streets are broad and straight and cross each other regularly at right angles, whilst all the principal buildings are near to the shore.

History

Manfredonia was founded in 1256 by Manfred of Hohenstaufen and peopled by the inhabitants of the ancient city of Sipontum, which was abandoned at this time, probably on account of malaria. Charles of Anjou tried to obliterate the name of its rival by calling it Nuova Siponto, but the name Manfredonia persisted. It was among the fiefs granted by Joanna II to her condottiere, Sforza, the father of the Duke of Milan. In 1620 it was taken by the Turks after a three days' siege and completely destroyed. At dawn on 24 May 1915 Austria opened hostilities with Italy by bombarding the railway station and sinking a ship in the harbour.

Public Buildings and Monuments

The cathedral, dating from 1624, is uninteresting, but the church of S. Domenico (1294-1299) escaped destruction by the Turks and has some good frescoes. The Castello was begun by Manfred and enlarged by the Angevins. Some 2 miles from the city is the beautiful twelfth-century church of Sta. Maria di Siponto, built on the site of the Roman city, and formerly the cathedral.

Industry

Manfredonia is a small agricultural market as well as a fishing centre and port for the Tavoliere di Puglia. Its only industries are small and are connected with the processing of local agricultural products, though there is a cement works near the railway station.

Description of Port

Manfredonia is an artificial harbour almost entirely enclosed by two moles, the east mole projecting about 3,200 feet from the shore, abreast the castle, in a south-south-easterly direction, and the south mole projecting about 2,900 feet in an east-south-easterly direction towards the outer end of the east mole from a point on the shore about 3,400 feet south-westward of the latter.

The harbour is entered from the south, between the east breakwater and the head of the south mole, the entrance having a width of about 825 feet and a least depth of 20½ feet. The harbour is triangular in shape with the shore side as the base and the moles the other sides, and has a length of about 3,000 feet with a greatest width of about 2,300 feet. The water area in the harbour is approximately 125 acres, the general depth being about 15 feet. Alongside the east mole, it varies from 1½ feet at the shore end to 21 feet at the head. Dredging operations in 1937 increased the depth along the inner side of the south breakwater to 19½ feet. This dredged area extends northward 660 feet from the south mole and parallel to it for 2,325 feet. Along the shore between the moles the depth varies from 1½ to 10½ feet. The shore itself consists of a wide, flat stretch of sandy beach backed by a wide avenue (I, Plate 30).

The main berthing place is at the inner side of the south mole to seaward of a small pier projecting into the harbour near its root. Vessels may also be berthed along the outer end of the sheltered side of the east mole, where the depth of water varies from 15 to 21 feet. On the north-west side of the harbour there is a quay 400 feet wide, with a frontage of about 1,800 feet. Alongside the outer face of this for a length of about 1,000 feet there is a depth of water of 10½ feet, and depths of 6 feet and 3 feet at the west and east ends respectively.

The commerce of the port consists mainly of imports of coal, coffee, sugar, spirits, and timber for building purposes, while olive oil and dried fruits comprise the bulk of the export trade. Steamship services are maintained between Manfredonia and Bari, Brindisi, Zara, Pola, Trieste, Venice, ports on the Gargano peninsula, and the Tremiti islands.

Inland Communications

Railway. There is a single-track line from Manfredonia to Foggia.

Roads. Road 89 from Foggia goes through Manfredonia and round the Gargano peninsula to S. Severo. A main road also leads to Cerignola and secondary roads to Monte S. Angelo and Barletta.

PESCARA. Latitude $42^{\circ} 28'$ N. Longitude $14^{\circ} 13'$ E. Population 35,877. Provincial capital.

Position and Site

Pescara stands at the mouth of the wide flat-bottomed Pescara valley where it opens out on the narrow beach-fringed coastal plain which borders the Adriatic coast between Vasto and Ancona. The Pescara valley at its mouth is about 3 miles wide and affords the city ample room for expansion. The Apennine foothills rise fairly steeply from the valley floor to heights of 450–500 feet about 2–3 miles from the city, though they tend to rise more gently from the $\frac{1}{2}$ -mile-wide coastal plain.

The city, which has grown rapidly in recent years, comprises the two adjoining towns of Castellammare Adriatico and Pescara. Castellammare Adriatico, which is the larger of the two, is a bathing resort on the coast to the north of the Pescara river, and consists of villas and blocks of modern houses served by wide straight streets intersecting at right angles. Pescara proper, the old and original nucleus, is south of the river and about a mile from the sea. The two parts of the city are connected by a road and a railway bridge.

History

Pescara is the ancient Aternum or Ostia Aterni, first mentioned in the second century B.C. and important both as a means of communication with the East, and as the terminus of the Via Valeria, an extension of the Via Tiburtina made by the Emperor Claudius. In the fifteenth century it became a fief of the Spanish house of D'Avalos and the first marquisate in the Neapolitan kingdom. Ferdinand, Marquis of Pescara (1490–1525) was one of Charles V's ablest generals who distinguished himself at the battle of Pavia, and married the poetess Vittoria Colonna. Gabriele d'Annunzio was a native of Pescara, and a volume of his stories is entitled *Novelle del Pescara*. It is to-day one of the most important commercial and industrial centres of the Abruzzi.

Public Buildings and Monuments

Pescara is almost entirely modern. The fortress built by Charles V is now a prison. The adjacent Pineta, or pine forest, is well known for its large bathing establishments.

Industry

Pescara is an agricultural market, a fishing-port, and a minor industrial centre. The principal industries are concerned with local products and there are olive-oil mills and presses, soap, biscuit, and pasta factories, liqueur distilleries, woollen mills, china, pottery, and glass works, and a factory for cement goods. Other industrial plants include several machine shops and foundries manufacturing looms, oil presses, pumps, and baking machinery, chemical works making ultramarine, and furniture factories.

Description of Port

The mouth of the Pescara river forms a small harbour, used mostly by fishing-vessels. The entrance is protected by two reinforced concrete moles which project north-easterly into the sea. The Molo di Maestro, on the northern side of the entrance, is approximately 1,650 feet long. The Molo di Scirocco, on the southern side, is about 1,575 feet long, of which about 650 feet project from the shore. Both moles are protected on their outer sides by rocks and are connected with the land by concrete walls. Entry is difficult with winds blowing from the first quarter. The entrance channel is subject to considerable and sudden changes in depth, due to the silt deposited by the current. The entrance to the harbour is exposed to easterly and north-north-easterly winds. The former blow violently, and it is difficult to enter the port with winds blowing from the first quarter. The prevailing winds are westerly and south-westerly in winter, and south-easterly in autumn.

Inside the entrance the channel of the river, for approximately $\frac{1}{2}$ -mile, serves as the harbour, in the deepest part of which there are depths of 8 to 11 feet. The general depth, however, is believed to be about 10 feet. Vessels with a draught of not over 9 feet can find shelter in the stretch of the river below the highway bridge. Small boats can moor against the bank, where bollards are provided at frequent intervals. The entrance moles are quayed on their inner sides and are provided with mooring bits, and some sections of the river banks may be quayed. In 1927 the construction of two docks near the mouth of the river was projected. Vessels drawing over 6 $\frac{1}{2}$ feet anchor off the port and discharge into lighters. Small craft moor against the banks of the river. Normally about 50 lighters and 5 tugs are available in the harbour and for unloading vessels in the roadstead.

There are two boat builders and several machine shops and

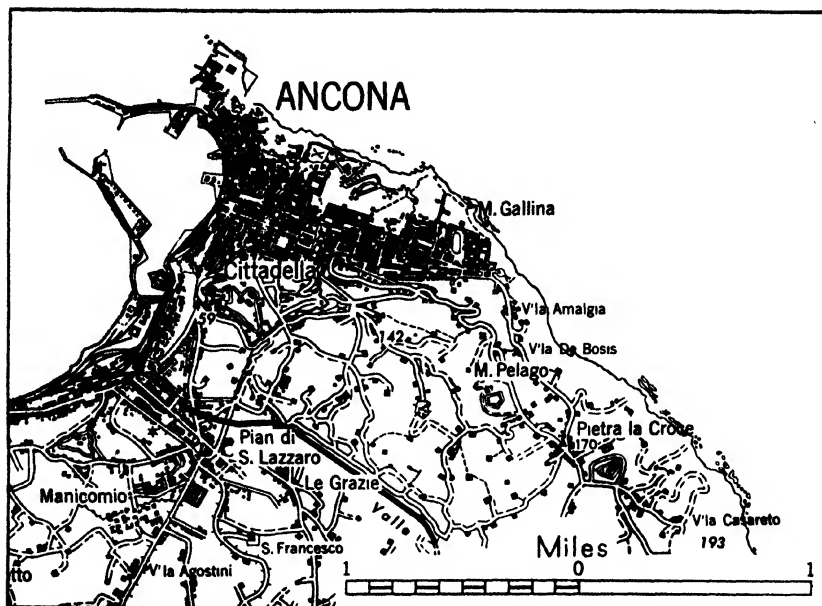


FIG. 25. *Ancona*

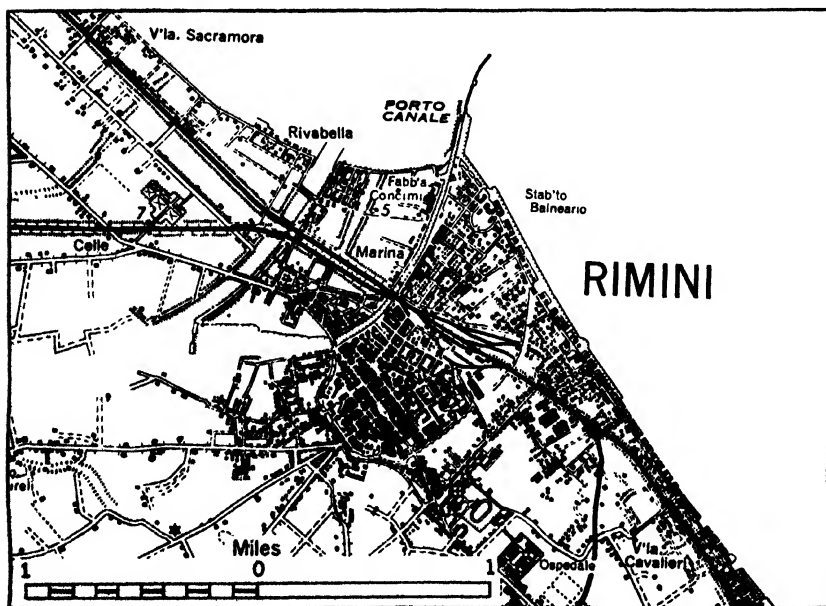


FIG. 26. *Rimini*

foundries in Pescara. Limited repairs to vessels and machinery can probably be undertaken by these establishments.

Inland Communications

Railways. Pescara has two stations—Centrale and Porta Nuova; both are on the main Adriatic coast line (mainly single track) from Rimini to Foggia and Lecce, and the latter is the junction for the single-track line to Sulmona and Rome, electrified after Sulmona. A narrow-gauge electrified line from Pineta di Pescara to Penne runs through the city. There is also a tramway from the Central station to the Pineta.

Roads. Pescara lies between Ancona and Foggia on coast road 16. Road 5 goes to Rome, and a secondary road follows the left bank of the Pescara river to join road 81 for Penne.

Airfield. There is an airfield about 3 miles up the Pescara valley.

ANCONA. Latitude 43° 37' N. Longitude 13° 31' E. Population 57,068. Provincial capital. Seat of archbishopric. Chamber of Commerce. British Vice-Consul.

Position and Site (Fig. 25)

Ancona, the only port of any size between Bari and Venice, is on the east shore of a small bay formed by the northern tip of the Conero mountain block or headland, which is here $1\frac{1}{2}$ –2 miles wide. The limestone block is about 9 miles long and attains its greatest height in M. Conero (1,887 ft.), 7 miles south-east of Ancona. The headland is cliffed on its east side and interrupts the even curve of the beach-fringed coast between Vasto and the Po delta. Inland it is separated from the Apennine foothills by the alluvial valley of the F. Aspio, which is followed by the coastal main road and railway.

The old part of the town, originally entirely walled, is on the east side of the artificial harbour and climbs up the slopes of M. Guasco and M. Astagno, the northernmost points of two north-west to south-east ridges of M. Conero. The cathedral on M. Guasco is at a height of 243 feet, though the ridge rises to about 300 feet farther east. M. Astagno (330 ft.) is crowned by the sixteenth-century citadel with its elaborate fortifications, and falls so steeply to the bay on the west that urban development has been limited to the narrow coastal strip, though there is some building on the north-western slopes. A modern part of the town has recently been built in the depression between the two ridges and now extends to the east coast of the

mountain block. In the extreme north of the town beyond the tip of the headland some land has recently been reclaimed which is now the site of the port's large shipyard (p. 362). Another modern section has developed south-westwards along the narrow coastal plain bordering the southern shores of the bay, and inland up the valley south of the M. Astagno ridge. The main industrial establishments are here, generally close to the railway. The old town on the hill slopes is congested and served by steep, narrow, winding streets. The modern part of the town in the depression has, east of the Piazza Cavour, wide straight streets intersecting each other at right angles.

History

Ancona was founded in 387 B.C. by exiles from Syracuse who fled thither from the tyranny of Dionysius. Its name is derived from a Greek word meaning angle or elbow, referring to the promontory, forming a half-circle round the harbour, on which the old city stands. It flourished under the Roman Empire, especially after Trajan fortified it and built the harbour mole to the vast improvement of the port. During the wars of Belisarius and Narses with the Goths it was fiercely contested. The chief city of the Pentapolis, it formed part of the Exarchate of Ravenna and passed to the Church in 756. As a free city under papal suzerainty it was beset by many enemies in the course of the Middle Ages. It was raided by the Saracens, attacked by the Emperors Lothair and Barbarossa, and in 1348 fell into the hands of the Malatesta. Cardinal Albornoz recovered it for the Church in 1355, building a fortress which the citizens subsequently destroyed. When in 1445 it was besieged by the Aragonese fleet, the siege was raised by the Venetians. In 1464 it was the meeting-place of the crusading forces which Pius II hoped to lead against the Turks, and here Pius II himself came, only to die before the expedition started. Clement VII brought it under the direct rule of the Papacy in 1532, and the building of a citadel on M. Astagno by Sangallo marked the end of its independence. The Italian fleet bombarded the port in 1860 whilst the army under Cialdini besieged it until it threw open its gates to the national forces. In the War of 1915-1918 it was several times bombarded by the Austrians from both sea and air, serious damage being done to the cathedral.

Public Buildings and Monuments

The two monuments of outstanding interest in Ancona are Trajan's arch and the cathedral of S. Ciriaco. The arch is a masterpiece of

Roman architecture erected in A.D. 115 by Apollodorus of Damascus in honour of Trajan's munificence in reconstructing the harbour at his own expense. Close by is the Arco Clementino designed by Vanvitelli in honour of Pope Clement XII, an eighteenth-century work which does not bear comparison with its classical prototype. The cathedral has a superb position on the edge of the promontory overlooking the open sea, at the summit of the hill up which the old city winds from the busy harbour and wide streets of the modern city below. Dedicated to a fourth-century Bishop of Ancona and martyr, it is a building in mixed Romanesque and Byzantine style, dating from the twelfth and thirteenth centuries. Among its notable features are the twelve-sided cupola and the beautiful portico, ascribed to Margaritone d'Arezzo. An inscription behind the high altar records that Pius II's heart was buried here in 1464. The Museo Nazionale delle Marche contains important archaeological specimens and some good pictures. Near the harbour are the Romanesque church of Sta. Maria della Piazza and the Loggia dei Mercanti, with a rich façade in the Venetian style (1451-1459).

Industry

The shipyard of the Cantieri Navali Riuniti is the only large industrial undertaking in Ancona. This yard, which employs about 1,500-2,000 persons in peace-time, is equipped to build light cruisers, destroyers, and submarines (p. 362). There is also a small shipyard as well as about six firms of boat-builders. Most other industrial plants are small, though Fiat employs about 400 workers in its internal combustion engine plant. Other establishments include small woollen mills, chemical and soap works, foundries, flour mills, pasta and preserved fruit factories, distilleries, boot and shoe factories, and glass works.

Description of Port

The harbour lies on the west of the promontory on which the town has been built, its entrance facing west-north-west. The inner harbour is roughly circular and is protected on the north and south-west by irregular moles, from which extensions have been more recently made to form a smaller outer roadstead. The approaches are clear, but anchorage outside the harbour is very exposed.

The northern mole is roughly 1,150 yards long and has been built in four successive arms, the Molo Nord (the outermost consisting of two arms), the Molo Clementino, and the Molo Traiano (the innermost),

the latter being the original protective work of the Roman port. At the junction of each leg is a spur representing earlier breakwaters, the innermost of which has now developed into the main jetty of the port, the Molo Luigi Rizzo. The south-western mole, the Molo Sud, is irregular in shape and extends nearly $\frac{3}{4}$ mile north-west from the south-west of the town. A recently constructed arm projects from near its head north-westwards towards the outermost leg of the northern mole to form the outer roadstead. The entrance to the inner harbour is between a rubble extension of the Molo Sud and a breakwater of similar construction opposing it, the central of the three spurs from the northern mole. The passage is 492 feet wide with depths of 26 feet. Depths in the north are from 26 to 29 feet, and in the south from 13 to 18 feet.

The whole shore of the inner harbour is quayed and there are three jetties: the Molo Luigi Rizzo, already mentioned, in the north, and the Moli Trapezoidale and Costanzo Ciano (formerly Sta. Maria) on the east. In the south a secondary circular basin, the Mandracchio, with depths of about 13 feet, surrounds the pentagonal Mole Vanvitelliana, which used to be the Lazaretto. Near the root of the Molo Sud there is a small shipyard with a patent slip, and, to its north, a seaplane station; the north and centre of the mole have recently been widened to form additional quay space.

Quays are between 6 and 7 feet high except on the two outer sections of the northern mole and on the widened quay of the Molo Sud where they are 8 feet high. Berthing is normally alongside, and the best and busiest quays are in the north of the inner harbour.

Outside the root of the northern mole is the building yard of the Cantieri Navali Riuniti, facing west and partially protected by a short rubble breakwater on the north-west. To its north an additional rectangular area of about 10 acres is being reclaimed behind quays of a total length of some 2,000 feet in connexion with an expansion of the dockyard. Shops and a new slipway are in commission on the completed western half: the east is (1943) not yet filled in.

Facilities. The office of the Captain of the Port is at the head of the Molo Costanzo Ciano, and the customs-house is at the root of the same jetty. The Health office is in the centre of the Molo Luigi Rizzo and that of the Harbour Police is just to its north.

There are 2 small fixed cranes in the Mandracchio. All the other cranes are concentrated on the north of the inner harbour. There are 3 on the Molo Clementino, 2 on the west side of the Molo Luigi Rizzo,

and 1 on the east quay of the Banchina S. Primiano: all are electric, travelling, portal, fixed-jib with grabs, and of 4 tons capacity. The Cantieri Navali Riuniti has 2 tower cranes and 5 guyed derricks. A number of floating sheerlegs is part of the normal equipment of the port.

The Mole Vanvitelliana in the Mandracchio is completely occupied by a special tobacco warehouse. The principal general warehouses are behind the Calata Nazario Sauro on either side of the Molo Trapezoidale. They are reputed to have a total capacity of about 460,000 cubic feet.

The coal quays are the Molo Clementino and the west side of the Molo Luigi Rizzo, and stocks are held by the State Railway and by private firms. The oil wharf is at the south end of the widened part of the Molo Sud, and there are two oil tanks at the root of this break-water (Appendix II).

Good water in abundance is available in the harbour area. All quays and jetties are lit by electricity.

The seaplane station at the root of the Molo Sud has a slipway 20 feet wide, and the small yard to its south has one of 120 feet wide, but only capable of dealing with small craft. Outside the harbour the Cantieri Navali Riuniti has 5 building slips, of which the largest is 520 feet long, and a marine railway 213 feet long with a cradle 100 feet long and of a lifting capacity of 500 tons.

The main Adriatic coast railway passes through Ancona. From the station and marshalling yard on the south-west of the town a line runs northwards along the east and north of the harbour as far as the west end of the Molo Clementino. At the south-east corner of the Mandracchio a branch curves back west along the south of the Mandracchio and out on to the Molo Sud, and at the north-eastern corner of the harbour a siding enters the shipbuilding yard. There are right-angle spurs from turntables on to all three jetties. Electric winches and diesel tractors are used to move rolling-stock. Lines are flush except along the Calata da Chio in the south-east. The port road which parallels this harbour line connects to the main roads out of the town; the quays on the east side of the harbour are open to this road, but the roadways on the two protective moles are constricted at their roots. The channel between the Mole Vanvitelliana and the shore to its east is blocked for all but very small boats by the foot-bridge at the north corner of the Mole Vanvitelliana, by the road bridge on its north-east side, and by the railway bridge at the south-east corner, which has arches only a few feet high.

No.	Name	Depth alongside (feet)	Length (feet)	Facilities, &c.
1	Molo Nord . . . Extension . . . Quay . . .	.. 32 18	.. 985 650	Quay only on south side. .. Parapet on north side. Two short rubble breakwaters at each end, quays irregular at their roots.
2	Molo Clementino .	10-25	850	Slightly curved. 3 cranes. Coal and phosphates.
3	Molo Luigi Rizzo . West side . . . Head . . . East side . . .	.. 23-27 25-32 23-27	.. 590 360 650+90	Health and Harbour Police offices. Two cranes. Coal and phosphates. ..
4	Banchina S. Primiano . North quay (Molo Traiano) . . . East quay . . .	.. 20 18	.. 210 330	Enclosed by wall and building. Naval ships fitting out. One crane. Naval ships fitting out.
5	Calata Nazario Sauro . North part . . .	.. 22	.. 380+345	Ships fitting out.
6	Molo Trapezoidale . North side . . . Head . . . South side . . .	.. 22-23 22 22-23	.. 350 70 310	Small boat-camber at south-west corner.
7	Calata Nazario Sauro . South part . . .	.. 22	.. 490	Customs-house behind south end.
8	Molo Costanzo Ciano . North side . . . Head . . . South side . . .	.. 22 26 24	.. 490 215 330	Formerly Pontile Sta. Maria. Captain of Port's offices at head. Large building in centre is new Stazione Marittima.
9	New quay . . .	16½-25½	330	Small coasters.
10	Calata da Chio . . . North part . . . South part . . .	.. 4-11 7-12	.. 215+650 330+730	Formerly Calata Fryatt. ..
11	Mandracchio . . . South quay . . . West quay . . .	.. .. 4-13	.. 440 715	Pentagonal island. Mole Vanvitelliana occupies most of eastern half. Fish market behind.
12	North-west quay . Idroscalo (Seaplane Sta.)	.. c. 5	410 250	Curved. Two oil tanks at south end. Buildings of shipyard behind.
13	Petroleum wharf . .	13	480	Hauling-up slipway 60 ft. from south end. At south end slipway, 120 ft. wide and between two piers, of shipyard.
14	Molo Sud . . . Southern leg . . . Northern leg . . .	.. 14-23	.. 1,306 505	Undeveloped. Intended for coal and phosphates. Short rubble extension at head. Outside unquayed, with 3 groynes.
15	South breakwater extension . . . Inner leg . . . Outer leg . . .	.. 23 26-28	.. 622 315	Triangular area at root being filled in. Inner 436 ft. of inner leg not suitable for berthing.

Trade and Connexions. Ancona has a considerable passenger traffic and commercial trade, but the goods landed are greatly in excess of

those dispatched. In 1939 the ships that used the port numbered 1,740 and totalled about 1,000,000 tons, slightly less than in 1938. Imports and exports in the same year were respectively 457,000 tons and 97,000 tons. Coal and coke made up more than 50 per cent. by weight of the imports, and were followed by phosphates, metallic minerals, and mineral oil. The principal exports are normally lime, sulphur, and local agricultural produce. A large quantity of fish is landed on the south quay of the Mandracchio.

The number of passengers that disembarked and embarked in 1939 was respectively 24,862 and 25,953, about 5,000 less in each case than the previous year. There are daily services from the port to Zara, and two or three times a week, according to the season, and by alternative routes, to Pola and Fiume. The following services to and from Venice call: weekly, the coastal service to Naples, Genoa, Marseilles, and Valencia; fortnightly to Sicily, Sardinia, and Genoa, to Sicily, Naples, and Genoa, with connexions from the last to Morocco, to the Piraeus, Crete, Alexandria, and Palestine, to Cyprus, Alexandretta, Syria, Palestine, and Alexandria, and (inwards only) from the Danube ports, Istanbul, Salonika, and the Piraeus to Venice and Trieste; and monthly to Port Said, the Red Sea ports, Madras, Calcutta, and Rangoon.

Inland Communications

Railways. At Ancona the double-track electrified section of the Adriatic coast line from Rimini (and Bologna) ends, and continues as a single-track steam-operated line to Foggia and Lecce. The electrified line to Rome via Foligno (single track to Orte and double track thence to Rome) joins the Adriatic coast line at Falconara Marittima, near Ancona. Ancona Marittima is the harbour station. Electric trams run from the main line station to the centre of the modern city and to Falconara.

Roads. Ancona lies between Pesaro and Pescara on the Adriatic coast road (16) from Padua to Lecce. There is a secondary road through the Conero mountain block to Porto Recanati, also on road 16.

Airways. A weekday service to Rome formerly operated from the airfield near Falconara Marittima, 5 miles to the west of Ancona. The services to Zara and to Lussino, Pola, and Trieste used the sea-plane station near the south end of the harbour.

PESARO. Latitude 43° 55' N. Longitude 12° 54' E. Population 24,163. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site

Pesaro is on the Adriatic coast 30 miles north of Ancona and the M. Conero headland, and immediately south-east of the less pronounced headland of Pesaro-Cattolica. The city is built on an alluvial and sandy plain to the south of the mouth of the F. Foglia. The fertile and cultivated plain is about 2-3 miles wide from north to south, and continues from the coast south-westwards up the Foglia valley for about 8 miles.

The undulating and highly dissected Apennine foothills edging the plain are about 300-600 feet high and come down to the sandy coast in low steep cliffs immediately north-west of the town and about $1\frac{1}{2}$ miles south-east of it. The plain was liable to flooding until the Foglia was regulated in the eighteenth century by Pope Clement XI. The city still occupies its fifteenth-century site about 500 yards inland, and much of its pentagonal walls with their upright bulwarks, moat, and earthworks, which were built by Francesco Maria della Rovere, still remain. The modern bathing-resort with gardens and wide, straight, tree-lined avenues is to the north-east of the old city, whilst the port is at the forked mouth of the Foglia.

History

Pesaro is believed to have been founded by the Piceni about the ninth century B.C. The Romans, who knew it as Pisaurum, occupied it in 283 B.C.; it later became a colony and a place of importance under the empire. In A.D. 536 it was destroyed by the Goths, after a memorable siege, but was rebuilt by Belisarius. Like Rimini it was a city of the Pentapolis and passed to the Church by the Donation of Pepin (756). For a time it was a free commune, but in 1296 Gianciotto Malatesta was made podestà, and established the lordship of his family over the city. In 1445 Galeazzo Malatesta, having quarrelled with his cousin at Rimini, sold Pesaro to Alessandro Sforza, the brother of the future Duke of Milan, and he founded a dynasty which lasted till 1512. Here in 1493 came Lucrezia Borgia as the bride of Giovanni Sforza. Four years later the marriage was dissolved and in 1500 Lucrezia's ex-husband was driven out by Cesare Borgia. Unlike most of Cesare's victims Giovanni returned to Pesaro, but on the death of his son without heirs Julius II invested his own nephew Francesco della Rovere, Duke of Urbino, with the city. From 1521 Pesaro was the permanent residence of the ducal family. The Duchess Leonora entertained Pope Clement VII here on his way to crown Charles V at Bologna (1530), and here in 1573 Tasso recited

his *Aminta* before the court. On the death of the last della Rovere Duke in 1631, Pesaro, with Urbino, was merged in the Papal State. The musician and composer Rossini (1792-1863) was a native of Pesaro.

Public Buildings and Monuments

The most notable building in the city is the Palazzo Ducale, to which all the three ruling families of Pesaro have contributed. Originally the residence of the Malatesta, it was rebuilt by Alessandro Sforza in 1461, and restored, after a fire in 1512, by Genga for Francesco della Rovere. The Rocca Costanzo, now a prison, was built for Costanzo Sforza by Laurana (1474-1483), and is a good example of the military architecture of the fifteenth century. In the Palazzo Mosca the principal art collections of the city have been brought together; these include the Museo delle Ceramiche, the most important collection of majolica in Italy containing the products of Pesaro, Urbino, and other local centres of the work, dating mostly from the sixteenth and seventeenth centuries; there is also an interesting picture gallery with an altar-piece by Giovanni Bellini. The cathedral of the Assumption and S. Terenzio is a late-thirteenth-century building restored out of all recognition. More interesting are the churches of S. Domenico and S. Francesco, both with very fine fourteenth-century portals. A mile or two outside the city is the Villa Imperiale, so called because the foundation stone was laid by the Emperor Frederick III in 1469. It was greatly enlarged in 1530 by Leonora, Duchess of Urbino, who made of it a charming Renaissance villa with terraces and hanging gardens, its walls decorated with frescoes commemorating the exploits of her husband.

Industry

The industries of Pesaro, a sea-side resort and capital of its province, are diverse, but are mainly concerned with the processing of local products. Silkworms are reared locally and the silk produced is spun in the town. Fish is caught and packed, whilst repairs are done to fishing-vessels. A traditional industry is the making of pottery, most notably majolica ware (III, p. 351), the art of which was introduced to the city in the fifteenth century. The ceramic, brick, and tile industries all use local clay. There are also refineries for sulphur produced locally, and for sugar, whilst sporting rifles and motor cycles are also made.

Description of Port

Pesaro is a small artificial harbour to the east of the present mouth of the F. Foglia. The entrance channel is between two moles about 125 feet apart which extend in a north-easterly direction, the western for about 550 and the eastern for about 700 feet from the shore. The entrance is about 1,200 feet eastward from the mouth of the Foglia river, and the southern extremity of the harbour is about 100 feet from the east bank of the river. The eastern bank of the river is protected by riprap to prevent erosion during high water. Except for small shoals near the port, the approach to the harbour from the Adriatic is in general free and clear with the 5-fathom contour a little less than a mile off shore. The entrance channel is, however, only 10 feet deep.

There are about 2,750 linear feet of quays on the eastern side, which are provided with mooring bollards about 100 feet apart. This quay wall is lined with buildings for about 1,700 feet, the Port Captain's office being near their centre. A large mooring basin, 700 feet long and about 300 feet wide, opens lengthwise on the west side of the harbour about 700 feet from the entrance to the port and has an area of about 5 acres, with about 1,300 feet of quay wall. A smaller basin, just south of the larger, is 360 feet long and 135 feet wide. It also opens lengthwise on the west side of the harbour, and has an area of a little over an acre, and a length of about 620 feet of quay wall. The west quay at the south end of the harbour has an available berthing space of 980 feet. The total length of the harbour, including the entrance protected by the moles, is about 3,000 feet with about 600 feet serving as an entrance channel and small boat harbour. On the east bank opposite the north end of the large basin is a marine railway and small boat repair yard. The average depths along the quays is about 8 to 10 feet with depths of 11 feet in the large basin.

- The port has an extensive trade with Dalmatia, Trieste, Ancona, and Rimini. Exports are mainly fresh meats and fish, wines, olives, olive oil, silks, glass bottles, and pottery. Imports are mainly coal and wood.

Inland Communications

Railways. Pesaro is on the main double-track electrified line from Bologna and Rimini to Ancona.

Roads. Pesaro lies between Rimini and Ancona on road 16. In addition to local secondary roads there is a main road to Urbino.

RÍMINI. Latitude $44^{\circ} 3' N$. Longitude $12^{\circ} 34' E$. Population 31,505.
Seat of bishopric.

Position and Site (Fig. 26; Plate 34)

Rimini is on the extreme south-eastern edge of the Northern Plain where the Apennines leave the coast to curve north-westwards behind the city. The flat, fertile country round Rimini slopes gently south-westwards to the Apennine foothills, which reach heights of 500 feet about 5 miles inland. The old city is situated between the T. Ausa on the south-east and the former channel of the F. Marecchia, now called the Porto Canale, on the north-west, and is about $\frac{3}{4}$ mile from the present shore line. This site was selected because the Via Emilia, which follows the south side of the Northern Plain at the foot of the Apennines, and the Via Flaminia, the main east coast road, meet here. The junction of the two roads takes place in the centre of the Piazza Giulio Cesare. The medieval city, which roughly corresponded to the Roman site, was walled, but the walls were gradually pulled down to allow expansion until to-day only those on the west and south-west remain. During the sixteenth to eighteenth centuries the city was divided into four quarters, S. Francesco, S. Domenico, S. Agostino, and Servi, which correspond to the modern urban divisions of Cittadella, Clodio, Pataso, and Montecavallo. During the nineteenth century the suburb of S. Giuliano grew up along the Via Emilia between the old and new channels of the Marechia, the Borgo XX Settembre (Borgo S. Giovanni) along the Via Flaminia to the east of the Ausa, and the Borgo Mazzini (S. Andrea) to the west of the city on the road to Verucchio. The most important modern suburb is Marina, the popular bathing-resort which has developed north of the old city along and close to the sandy shore from the Porto Canale to the east of the Ausa. This suburb, which has a very seasonal population, is laid out with straight tree-lined avenues intersecting at right angles blocks of houses and villas.

History

The ancient Umbrian city of Ariminium became a Roman colony in 268 B.C., and was favoured and embellished by Julius Caesar and Augustus. Under the Byzantine Empire it was one of the five cities of the Pentapolis, which passed to the Church in 756 by the Donation of Pepin. After an uneasy existence as a free commune, disputed between Pope and Emperor, and torn by feuds between its own Guelf and Ghibelline families, the city acknowledged the lordship of one of

the leading Guelfs—Malatesta da Verrucchio, who founded the dynasty to which Rimini owes its fame. The 'old mastiff', as Dante calls him, lived to the age of 100 (1212–1312). His eldest son Gianciotto, or 'lame John', married Francesca da Polenta, whose tragic story, together with that of her brother-in-law and lover, Paolo il Bello, inspired one of the tenderest passages in Dante's *Inferno*. During the residence of the popes at Avignon, and the Great Schism, the Malatesta became a first-rate power in Romagna, bringing many cities under their rule and extending their influence into Lombardy. The noblest member of the family is Carlo, who distinguished himself by his honest endeavours to end the Schism. He received Pope Gregory XII at Rimini (1412), urged the summons of a council, and acted as Gregory's proctor at Constance, when the latter resigned the Papacy (1415). He was called in to restore order in Milan in the chaos which followed the death of Gian Galeazzo Visconti (1402). More famous is Sigismondo (1417–1468), whose restless ambition, unbridled vice, and deep devotion to learning and the arts make him an outstanding figure of the Italian Renaissance. In 1500 Cesare Borgia swooped down upon Rimini and Pandolfo Malatesta took refuge at Bologna. On his return he sold Rimini to Venice, to the disgust of the citizens. Julius II recovered it for the Church in 1509, and after this the history of the city is merged in that of the Papal States. It was from Rimini that Joachim Murat, after Napoleon's escape from Elba, made his famous appeal to Italian patriotism in a proclamation of March 1815 beginning 'Italians! Providence has called you at last to be an independent nation.' Of recent years Rimini has developed very considerably as a sea-side resort, and is now one of the most frequented in Italy.

Public Buildings and Monuments

Rimini has important Roman remains of which the chief is the Arch of Augustus, erected in 27 B.C. by the Senate and people of Rome, at the junction of the Via Emilia and the Via Flaminia, in honour of the Emperor Augustus and his work in road-making. The Bridge of Augustus, which spans the Marecchia, was begun in the last year of his reign and completed by Tiberius (A.D. 21). In Piazza Giulio Cesare, once the forum, is a statue of Julius Caesar, erected by Mussolini to mark the spot where Caesar is thought to have marshalled his troops after crossing the Rubicon. Of the amphitheatre only two arches are visible. The principal monument in Rimini is the cathedral, more appropriately known as the Malatesta temple. Once

the Gothic church of S. Francesco, it was transformed by Sigismondo Malatesta into a splendid Renaissance edifice which should perpetuate his own fame and that of his third wife and sometime mistress, Isotta. The design of the exterior is by Leon Battista Alberti; the sculptures of the interior are mainly the work of Agostino di Duccio. The work was begun in 1447 and continued feverishly for the next few years, but left unfinished at Sigismondo's death. The stone sarcophagi under the arcade outside the church, containing the ashes of the men of learning attracted to the Malatesta court, the reliefs of the signs of the zodiac, and of pagan gods and goddesses which adorn the chapels, and the constantly recurring initials S and I with Sigismondo's device of the elephant and Isotta's rose, are typical of the pagan spirit which inspires this amazing edifice. The fresco of Sigismondo and his two greyhounds kneeling before his patron saint is a fine work of Piero della Francesca. The ruins of the Castello Sigismondo give little idea of the mighty fortress built in 1446 by the military architect Valturio.

Industry

Rimini is to-day primarily a popular bathing resort, though also a market for a fertile agricultural region, a fishing port, and a minor industrial centre. The industries are very varied and its plants include sulphur kilns for extracting local sulphur, brick and tile works, rope walks, hosiery, woollen and silk mills, factories for chemical manures, agricultural machinery, wire netting, furniture, pasta, and soap.

Description of Port

Rimini is a canal port formed by two reinforced concrete moles, which extend in a north-north-easterly direction from the shore at the mouth of the Porto Canale. The west mole has a length of about 1,000 feet and the east mole of about 2,175 feet. The harbour extends from the entrance to the channel at the head of the west mole to a point on the river near the walls of the old town, a distance of about $\frac{1}{2}$ mile, and is bordered on both sides by quays. The entrance is dredged at times to a depth of 13 feet for about two-thirds of its width as far as the main lighthouse, but it is liable to silt up to a depth of 5 feet. Above the lighthouse the depth decreases gradually to $4\frac{1}{2}$ feet or less towards the end of its navigable length. The channel, about 85 feet wide at the entrance, widens a few feet between the moles, and then narrows gradually between the river banks.

Facilities. It is more of a fishing than a commercial port, and facilities are limited. A short distance inland beyond the root of the west mole on the west bank of the river there is a narrow channel affording access to a dockyard where there is a marine railway (cradle length of 137 feet and a capacity up to 300 tons).

Inland Communications

Railways. Rimini is on the double-track electrified line from Bologna to Ancona, which continues as a single-track steam-operated line along the Adriatic coast to Lecce. Rimini is the junction for the single-track line to Ravenna and Ferrara. Narrow-gauge railways also run to Mercatino Marecchia and San Marino, the latter being electrified. Trams serve the centre of the city and the beaches.

Roads. Rimini is at the junction of road 9 (Via Emilia) to Bologna and Milan with road 16, the Adriatic coast road from Padua to Lecce. Road 72 also branches off to San Marino, whilst nearby at Santarcangelo a main road leaves the Via Emilia to follow the Marecchia valley to the Viamaggio pass and thence to Arezzo.

Airways. Planes between Rome and Venice formerly called at the airfield near Riccione.

RAVENNA. Latitude $44^{\circ} 24' N$. Longitude $12^{\circ} 11' E$. Population 29,070. Provincial capital. Seat of archbishopric.

Position and Site (Plate 35)

Ravenna, originally built on islands in a lagoon, now stands on the flat cultivated Northern Plain about 5 miles from the sandy shore of the Adriatic and 9 miles south of the Valli di Comacchio. Marina di Ravenna (formerly Porto Corsini), Ravenna's port, is connected to the city, $6\frac{1}{2}$ miles to the south-west, by the Naviglio Candiano. The famous Pineta di Classe is about 3 miles south-east of the city immediately inland of the sand-dunes. The Roman site is in the western part of the modern city, and is bounded on the north between the Porta Saffi and the Piazza Littorio by the Via Cavour and Via G. Mazzini, and on the south by the Porta Aurea. The plan of this part of the city with its straight roads intersecting each other at right angles to-day bears a close resemblance to its Roman predecessor. In the fifth century A.D. two additions were made to the Roman town: in the south-east a triangular block bounded on the west by the Via Baccharini, and in the north a square block limited on the east by the Via

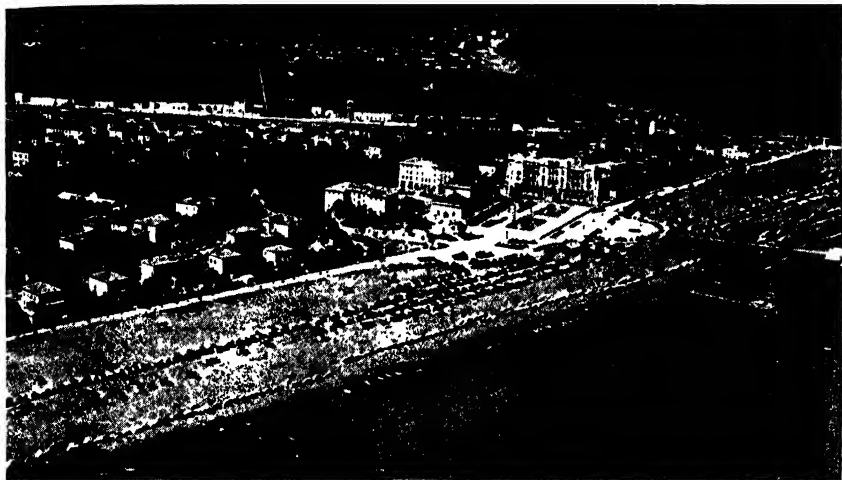


PLATE 34. *Marina di Rimini*

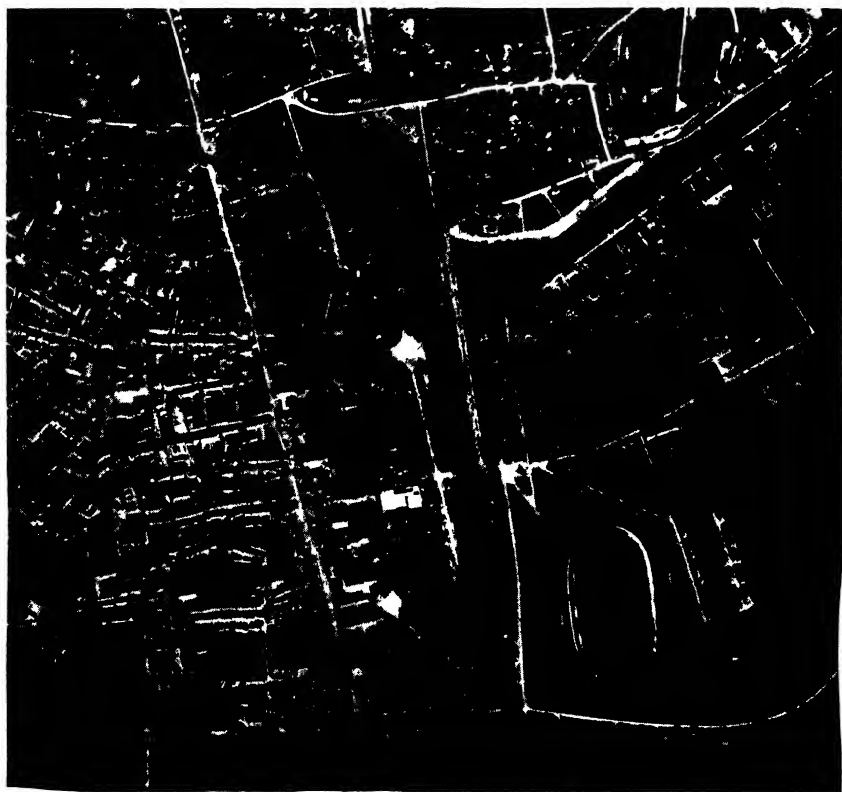


PLATE 35. *Ravenna*



PLATE 36. *Venice: Canale di S. Marco*

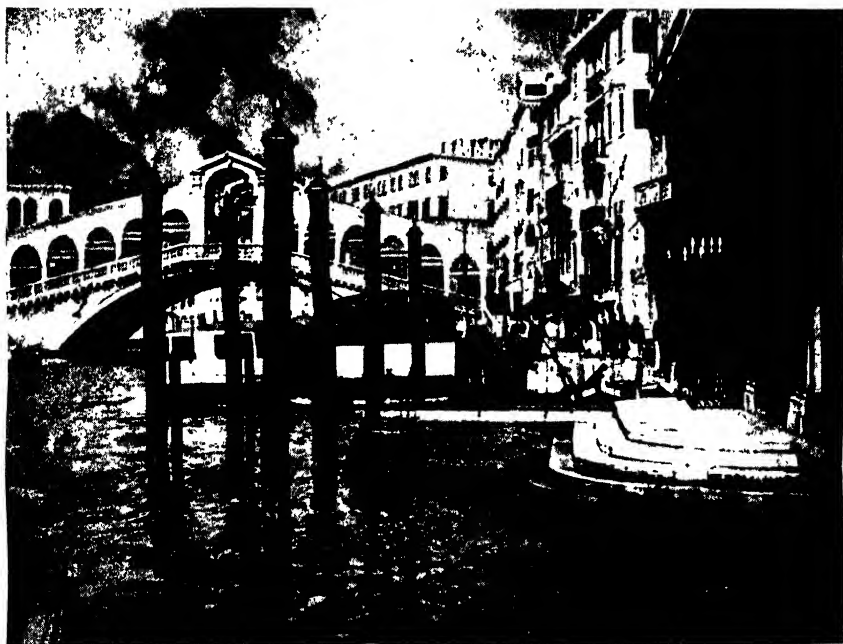


PLATE 37. *Venice: Ponte di Rialto*

G. Rossi. The rectangular block east of these additions was built under Byzantine rule. All further building to the east round the Darsena and to the south of the city is recent, as this now more active city has only just awakened from its long sleep.

History

Ravenna was built on islands in the lagoons probably by Umbrians fleeing before the Gauls. Its importance lay in its position, rendered immune from attack by the surrounding waters, and commanding the gap between the sea and the Apennines which led from the Cisalpine plain to Rome. Julius Caesar showed himself aware of its strategic significance when he occupied it before his crossing of the Rubicon. Augustus built the port of Classe connecting it with the city by the Via Cesarea. The great days of Ravenna began, however, in A.D. 404 when the Emperor Honorius made it his capital and fortified it against the barbarian inroads. He and his sister Galla Placidia enriched the city with examples of Byzantine art which exercised a profound influence over later barbarian conquerors. Theodoric, King of the Goths (493-526), made it his capital and added to its monuments. In 540 it was captured by Belisarius and became the base from which he and his successor, Narses, reconquered Italy for the Byzantine Empire. The Emperor Justinian and his wife Theodora were munificent patrons of Ravenna, which remained the capital of the exarchate until Byzantine rule was overthrown by the Lombards (752). After the Frankish conquest, Ravenna passed under papal suzerainty as part of the donation of Pepin, but it was long before the papal power was made effective. First under its Archbishop, then as a commune controlled alternately by Guelfs and Ghibellines, and from 1270 under the lordship of the Polenta, Ravenna remained virtually independent. It was at the court of Guido da Polenta that Dante spent the last four years of his life (1317-1321). In 1441 Venice gained possession of Ravenna and greatly increased its prosperity. Finally, in the War of the League of Cambrai it was recovered for the Papacy by Julius II (1509). At the battle of Ravenna (1512) the French defeated the forces of the Holy League (papal and Spanish), but the death of their leader, Gaston de Foix, robbed them of the fruits of their victory and the battle was the prelude to Louis XII's expulsion from Italy. During the nineteenth century Ravenna was in constant revolt against papal rule and ardent in the cause of liberty. In 1849 Garibaldi lay concealed in the pine forest outside the city after his historic retreat from Rome. On the rise of Fascism serious clashes between

Fascists and anti-Fascists took place during which the Hotel Byron, the poet's first residence in Ravenna, was burned to the ground.

Public Buildings and Monuments

As a centre of early Christian art Ravenna is unequalled. Its principal monuments belong to the fifth and sixth centuries and are famous above all for their mosaics. The earlier mosaics are ascribed to a local or Roman school and show a strong classical spirit; those of the later or Byzantine school are richer and more conventional. The Mausoleum of Galla Placidia, dating from the second quarter of the fifth century, is the oldest complete monument in Ravenna. It is a plain brick, cruciform building splendidly adorned with mosaics, among which the best known is Christ as the Good Shepherd, beardless and graceful, seated among His sheep. The cathedral was founded in the fifth century, but was destroyed in 1733 and at once rebuilt. The baptistery of the Orthodox, converted from a Roman bath in the middle of the fifth century, is still intact, and the mosaic in the cupola of the Baptism of Christ is one of the finest in Ravenna. Mosaics of the same period are to be seen in the chapel of the archbishop's palace. The church of S. Apollinare Nuovo was built by Theodoric at the beginning of the sixth century; a series of mosaics of the life of Christ represent one of the earliest attempts to tell the Christian story in picture. Two great processions of saints and martyrs on either side of the nave belong to the later Byzantine school of mosaics. The chief glory of Byzantine art in Ravenna is the church of S. Vitale, consecrated in 547. This octagonal building surrounded by a double ambulatory is as remarkable for its architectural construction as for its wonderful decoration in marble and mosaic. On the side walls of the apse are two great processional mosaics of Justinian with a train of attendants and Theodora with the ladies of her court. The most interesting relic of the Middle Ages in Ravenna is the church of S. Francesco in which Dante was buried. His bones were hidden by the Franciscans to prevent them from being stolen by the Florentines, and after their discovery in 1865 they were placed in a tomb outside the church, before which a lamp of remembrance burns continuously.

Some 3 miles from Ravenna the church of S. Apollinare in Classe is almost all that remains of the deserted port of Classe, from which the sea has long since receded. Founded in 549, it is a church of great size and beauty with fine mosaics of the sixth and seventh centuries. Beyond Classe is the celebrated Pineta or pine forest with

its reminiscences of poets and heroes from Dante to Byron and from Gaston de Foix to Garibaldi.

Industry

Ravenna is to-day essentially an agricultural market, and most of its industries are concerned with the processing of local products. Marina di Ravenna, however, is a fishing port and market as well as a bathing resort. Fruit and fish canning is important in Ravenna, and there are also pasta factories, flour mills, and sugar refineries. Jute is spun for the sacks, bags, and packing canvas used for packing the local agricultural products, whilst the Montecatini combine makes chemical manures. There are also sulphur refineries, terra-cotta and brick yards, lime-kilns, cement plants, engineering shops, boot and shoe factories, and a plant for industrial oil.

Description of Port

The port of Ravenna consists of three different parts: the harbour at the mouth of the canal, known as Marina di Ravenna; the canal, known as the Naviglio Candiano (formerly the Corsini Canal), connecting the city with the sea; and the wharves and basins in the city of Ravenna.

The harbour of Marina di Ravenna is artificial, with a water area of 19·8 acres. The entrance is formed and protected by two parallel moles, 130 feet apart, which extend seaward in an east-north-east direction for about 2,840 feet for the north mole and 2,930 feet for the south mole, the depths of the entrance being 18 feet. The approaches to the port entrance are free and clear of obstructions in the Adriatic with the exception of a point off the end of the south mole, marked by a buoy, where there is an obstruction left from the time of construction. Ships should pass to the right of this buoy when entering. The coast is shallow, and the 5-fathom contour is nearly 3 miles off shore. Swells and the remains of the old piling near the moles considerably reduce the depths in the entrance, but the latter are reported as being removed. Access to the harbour entrance is dangerous and inadvisable in bad weather without the help of pilots, especially when the current is running in.

The two banks of the harbour of Marina di Ravenna are quayed from the root of the moles to and beyond the entrance to the Naviglio Candiano. There are basins in both north and south walls for the use of sailing- and fishing-boats, and altogether 3,575 feet of quays with depths alongside of 17½ feet at low tide. Just west of the root of

the north mole there is an irregular quadrilateral shaped basin 620 feet long and averaging 165 feet in width, with depths of 10 feet, used by fishing-vessels only. About 600 feet west of this basin, and also in the north bank, there is a basin of trapezoidal shape, about 350 feet long and 60 feet wide, with a depth of about 18 feet. This basin is used by sailing-boats and auxiliaries. The two banks of the canal harbour are quayed from the shore end of the moles to and including the Lago Baiona, where there is a tanker pier on the south bank. This is believed to be of timber construction. The quays are lighted and provided with mooring bollards, whilst there are water hydrants on the south quay.

The Naviglio Candiano, which connects Marina di Ravenna with the port of Ravenna, branches off at an angle of 45° from the south bank of the harbour of Marina di Ravenna at a point about 1,300 feet westward of the root of the south mole, and runs in a south-westerly direction to the port of Ravenna. The canal is just over $6\frac{1}{2}$ miles long, has a width of 165 feet at the surface and of 65 feet at the bottom, and a uniform depth of $16\frac{1}{2}$ feet at low tide. The banks of the canal have been protected by wooden planking or wood fascines and clay to prevent erosion. Beginning at Ravenna, these supports are being replaced by reinforced concrete quay walls.

The port of Ravenna consists of a basin, about 100 feet wide and 1,000 feet long in a north-south direction, known as the old docks (Darsena Vecchia), and of a triangular basin known as the new docks (Darsena Nuova or Baccarini), adjoining the old basin at its north end, together with the quayed portion of the Naviglio Candiano. The water area of the port is 9 acres. The basins are quayed throughout, and the total length of the quays is about 5,000 feet, of which about 2,200 feet are in the old basin and about 2,800 feet in the new. The banks on both sides of the canal have been quayed for about a mile eastward from the basins. The depths alongside the quays in the new basin and along the canal is $17\frac{1}{2}$ feet. Vessels drawing 16 feet can berth sideways. The depths alongside the quays in the old basin are about 14 feet, and ships with a draught of 10 feet or less can berth sideways. The port is capable of handling vessels up to 360 feet in length.

Facilities. Storage facilities except for petroleum (Appendix II) are limited to the city of Ravenna itself, where stocks of coal amounting to 520 tons are normally kept. Drinking-water is available at both Marina di Ravenna and Ravenna itself. Only the western quays of the old dock and the northern quays of the new dock at Ravenna have

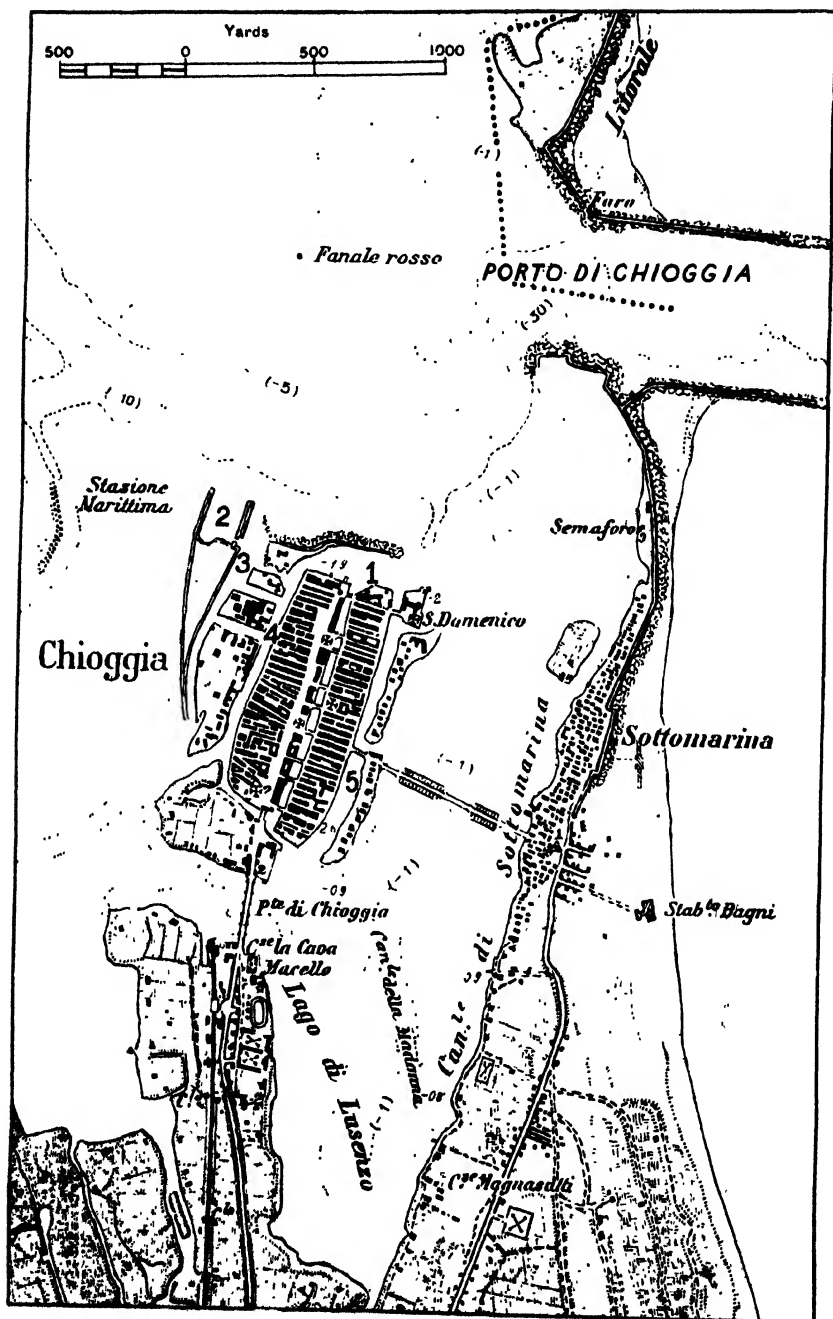


FIG. 27. Chioggia

railway facilities. There is a slipway for repairs for boats of less than 100 tons at Marina di Ravenna, and engineering shops at Ravenna. The port has weekly sailings to Venice, Fiume, Trieste, and Istrian ports. Marina di Ravenna is an important fishing port.

Inland Communications

Railways. Ravenna is a junction on the single-track railway from Rimini to Ferrara for the single-track line to Florence via Faenza. Russi, on this last line, is the junction for another single-track line to Lugo and Castel Bolognese, where it joins the main railway from Ancona to Bologna.

Roads. Road 16 from Padua to Rimini passes through Ravenna, where it crosses road 67 from Marina di Ravenna to Forlì, Florence, and Pisa. Faenza, Lugo, Imola, and Bologna are all linked by main roads, and Cesena by a secondary road.

Airfields. There is an airfield about 2 miles south of the city and a seaplane base at Marina di Ravenna.

CHIÓGGIA. Latitude $45^{\circ} 13' N$. Longitude $12^{\circ} 17' E$. Population 23,577. Seat of bishopric.

Position and Site (Fig. 27)

Chioggia is built on a compact, rectangular group of islands at the southern end of the Laguna Veneta, and is about 14 miles south of Venice, which it resembles though on a less magnificent scale. The Chioggia islands are connected on the south and east by two road causeways to the Litorale di Sottomarina, which forms the southernmost sand-bar sheltering the lagoon from the open sea. This island is pear-shaped, being only about 200 yards wide in the north and bulging to nearly 2 miles in the south, where it forms the northern bank of the wide mouth of the F. Brenta. On the north, about $\frac{1}{2}$ mile north-east of the town, it is separated from the Litorale di Pellestrina by the Porto di Chioggia, the most southerly of the entries from the Adriatic into the Laguna Veneta. On the south-west the island is connected by means of bridges and a narrow east-west spit, followed by the main road, to the Venetian plain, which is very marshy to the north of the road and cut up by numerous drainage canals to the south.

The main part of Chioggia is on the east and west Chioggia islands, which are about 1,000 yards long from north-north-east to south-south-west and about 200 yards wide. The town is divided into four main parts by three principal canals, the Canale S. Domenico between

three small eastern islands and the east Chioggia island, the Canale Vena between the two main Chioggia islands, and the Canale Lombardo between the west Chioggia island and the Le Vigne islands. The latter are separated by the Canale Saloni (3) from a newly reclaimed island with the Stazione Marittima (2) at its north end. A bathing suburb of the town has spread on to the western side of the Litorale di Sottomarina, whilst immediately to its west there are scattered dwellings on the Le Vignole group of low islands which are only separated from each other by very narrow canals. The main street, the Corso Vittorio Emanuele, runs lengthwise along the west Chioggia island and continues the line of the causeway on the south.

History

Chioggia was a station on the Roman waterway from Ravenna to Altinum, and is mentioned by Pliny as Fossa Clodia. The city was founded on islands in the lagoons by refugees from the barbarian invasions, and won the name of the eldest child of Venice. It was destroyed by the Franks under Pepin, but rose again in the ninth century and successfully defended itself against the Saxon emperors. In 1379-1380 it was the scene of the last great struggle between Venice and Genoa. The Genoese, having annihilated the Venetian fleet at Pola, sailed into the lagoons and took Chioggia, the Genoese admiral, Pietro Doria, boasting that he had come to bridle St. Mark's horses. Within four months the Venetians had with incredible energy built a new fleet, which blockaded Chioggia throughout the winter, and after a six months' siege obliged the Genoese to surrender. Venice was saved, and thirty plebeian families who had contributed most in men and treasure to the victory were made patricians. Chioggia itself was rebuilt, but it did not recover its former prosperity. It became a city of fishermen plying their trade under Venetian rule. Rosalba Carriera, the painter, was a native of Chioggia, and her house is still to be seen.

Public Buildings and Monuments

Chioggia has no buildings of much importance. The cathedral dates for the most part from 1633 and has a fine detached campanile. There are some half-dozen churches, of which the most interesting is S. Domenico, a building of ancient origin containing pictures by Carpaccio and Tintoretto. The Granaio (1322), with a wooden roof raised on stone pillars, is the fish and vegetable market. A picturesque corner of the city is the Piazza Vescovile planted with trees; along the

canal on its south side is an eighteenth-century balustrade adorned with statues, including a Madonna and Child celebrated as the *Refugium Peccatorum*.

Industry

Chioggia, essentially a maritime town, is one of the most important fishing-centres in Italy, and about one-quarter of the population gain their livelihood by fishing. Boat-building is a notable local industry, the boat yards specializing in the 10-ton type of fishing-boat generally used in the district. The packing and preserving of fish and the making of fish-nets are important industries, whilst the making of lace for tourists and export is also notable. Near by there is a large cement factory, whilst recently some of the inhabitants of the town have taken up market gardening on the adjacent areas of reclaimed marshland.

Description of Port

The port, mainly important for its fishing, is an artificial harbour within the Laguna Veneta at the junction of the Canale Perognola and the Canale di Caroman. Access to the sea is by the Porto di Chioggia between Forte S. Felice, on the northern extremity of the Litorale di Sottomarina, and Forte Caroman, on the southern extremity of Litorale di Pellestrina. The approach to the harbour from the Adriatic is free and clear. Two rock breakwaters, about 1,800 feet apart, are built out into the sea in an easterly direction to form the entrance to the port. The northern breakwater extends in an easterly direction from Forte Caroman lighthouse for a distance of about 5,900 feet. The southern breakwater extends easterly for about 4,900 feet from its junction with a jetty, which projects north-east from the Sottomarina sea-wall at a point about 300 feet south-east of Forte S. Felice.

The passage of the Porto di Chioggia is often impracticable due to heavy seas raised by north-easterly, easterly, or south-easterly winds, and a frequently strong current. Depths in the entrance, on the range line, are 15 feet up to the deep hole immediately north-westward and westward of, and almost touching, Forte S. Felice, where a depth of 96 feet is reported at one place. Vessels drawing more than 12 feet are advised to keep northward of the entrance range when entering or leaving the port. General depths inside the port are from 9 to 27 feet, but the greatest depths are found along the southern shore, following the course of the Canale Perognola. The northern part of the port is

shoal. The currents are strong and are influenced by heavy rains, freshets of the rivers, and bad weather at sea.

The Bacino di Vigo (1) on the northern side of the town and southward of the Canale Perognola, is a small inner harbour, protected on the north by the Diga delle Saline, which extends north-easterly and easterly for about 1,200 feet from the north-eastern extremity of the northernmost of the Le Vigne group of islands. The basin, which opens to the east, has a maximum width of 410 feet and a depth of 16 feet in the centre, but normally only vessels up to 11 feet draught can enter. At certain stages of the tide entry is possible for vessels drawing up to 14 feet.

The Stazione Marittima basin (2), to the westward of the Bacino di Vigo, is protected on the west by a breakwater which projects northerly about 750 feet from the north-western extremity of the westernmost island of the Chioggia group, and on the east by a mole extending northerly about 600 feet from the north-eastern extremity of the same island. A passage with a depth of only 2 feet leads through the root of the mole and connects the Stazione Marittima basin with the Canale Saloni and the Bacino di Vigo.

The Canale Saloni (3), extending from north to south, separates the Le Vigne islands from the unnamed island to the westward. Depths of 2 to 7 feet exist in the channel, with 3 feet at the upper end and 4 feet at the lower. The northern end is closed by a continuation of the Diga delle Saline, which projects west-north-west about 200 feet to the mole on the eastern side of the Stazione Marittima basin. The Canale Saloni is entered from the south by a branch of the Canale Lombardo, from the north-west through a shallow passage leading from the Stazione Marittima basin, and from the east by three shallow canals connecting with the Bacino di Vigo and the Canale Lombardo. The western side of the canal and part of the eastern side are quayed.

The Canale Lombardo (4), which enters the port from the south-west, separates the north and south Le Vigne islands from West Chioggia and discharges into the south-western corner of the Bacino di Vigo. The depth in the southern entrance is less than 6 feet. Depths along the quays fronting the eastern and part of its western sides vary from 6 to 9 feet, the greatest depth being about 14 feet.

A canal at the south end of the Canale Lombardo leads south-east and east under a highway bridge, connecting the southern entrances of the Canale Vena and the Canale S. Domenico before crossing the Laguna di Lusenzo in a south-easterly direction, to form a junction with the Canale di Sottomarina.

The Canale Vena separates East and West Chioggia islands. The use of this canal as a navigable waterway is probably determined by the minimum clearance of the nine highway bridges crossing it, rather than the depth of water in the channel. No craft larger than gondolas can normally pass under the bridges.

The Canale S. Domenico (5) extends between East Chioggia island and the easternmost islands of the Chioggia group. Depths in the canal vary between 7 and 11 feet, and its western and part of its eastern sides are quayed. Two passages lead eastward to the Laguna di Lusenzo, which separates Chioggia from Sottomarina, and one northward, under a highway bridge, to the entrance to the Bacino di Vigo.

The Canale di Sottomarina, which extends along the western side of the Litorale di Sottomarina, is quayed along the island front and has depths of 7 to 9 feet between the causeway from Chioggia and the upper end of Le Vignole island. Two channels lead westward to connect the Canale di Sottomarina with the main entrance channel and the Canale S. Domenico.

Other lagoon channels extended parallel to the islands and connect the port, including the town canal system, with the inland waterways north and south of Chioggia.

A substantial portion of the water-front of Chioggia is not improved, the face being inaccessible to boats, either because of rock revetments or lack of depth. Nevertheless, ample wharf space is available to meet the needs of local and coastwise trade. Pile markers are placed along all the main channels to outline the limits of deep water.

Loading and discharging of cargo is accomplished by ships' gear. Repair facilities are limited to 2 marine railways with capacities of 150 and 250 tons.

There is a daily steamer service across the Laguna Veneta to Venice.

<i>Name</i>	<i>Depth alongside (feet)</i>	<i>Length (feet)</i>	<i>Facilities, &c.</i>
Stazione Marittima (2):			
West Quay:			
West . . .	7-9	700	..
Head . . .	8	40	..
East . . .	5-8	600	..
South Quay . . .	5-7	75 + 75 + 190	Coastal traffic.
Saline Mole . . .	..	..	Coastal traffic.
West . . .	5-8	550	..
Head . . .	5	100	..
East . . .	..	350 + 190	..

<i>Name</i>	<i>Depth alongside (feet)</i>	<i>Length (feet)</i>	<i>Facilities, &c.</i>
Canale Saloni (3):			
West . . .	2-7	1,100+425+ 325	..
East . . .	2-7	325+375+ 250	Berthing space available, 50 ft.
North-east . .	5	370	Local farm produce.
North . . .	..	250	..
Le Vigne cut:			
South . . .	5-11	400+100+ 150	Local farm produce.
North . . .	5-7	650	..
Le Vigne island:			
North side . .	..	450+150	..
Canale Lombardo (4):			
Le Vigne island:			
East side . .	9-13	290+100	Local farm produce.
West . . .	11-14	500+50	Local farm produce.
East . . .	6-11	200+50+ 1,300+650	Custom-house near north end.
Canal at south end of W. Chioggia Island:			
North . . .		300+125	..
South . . .	..	200+200+ 175	Road traffic and passenger land- ing.
Canale Vena:			
West . . .	..	2,600	Gondola traffic.
East . . .	..	2,780	Gondola traffic.
Bacino di Vigo (1):			
North side of W. Chiog- gia Island . .	6-11	525	..
North side of E. Chiog- gia Island . .	..	500	Captain of the port office.
North side of S. Do- menico Island . .	..	300	..
South side of E. Chiog- gia Island . .	3	340	..
Canale S. Domenico (5):			
West . . .	6-11	500+2,100+ 275+475	..
South-east . .	7-11	1,400	Irregular face formed mostly of sloping banks.
North-east . .	..	300+75	..
East side of S. Do- menico Island . .	9-12	490	..
South side of channel south of S. Domenico Island . . .	9-12	400	A small pier projects from the face of this quay near its east end.
North side of channel south of S. Domenico Island . . .	9-12	240	..
Canale Sottomarina:			
West . . .	9	375+75	Local farm produce.
East . . .	2-9	6,000	Passenger and general freight.

Inland Communications

Railway. A single-track line runs from Chioggia to Adria and Rovigo.

Roads. A main road runs from Chioggia to Adria, whence main roads continue to Padua and Ferrara. Secondary roads from Chioggia, however, give more direct access to north Padua and Venice.

Inland Waterways. Chioggia is in direct communication with the waterways of the Po basin, the Venetian plain, and of the Litoranea Veneta (III, p. 494).

VENICE (Venézia). Latitude $45^{\circ} 26'$ N. Longitude $12^{\circ} 20'$ E. Population 170,830. Provincial capital. Seat of patriarchate. Chambers of Commerce. British Consul.

Position and Site (Fig. 28; Plates 32, 36 and 37)

The main part of Venice is built on a compact group of islands in the middle of the large shallow Laguna Veneta. Some of the suburbs of the city, however, extend on to other more scattered nearby islands, whilst the main industrial sections of Porto Marghera and Mestre are near by on the mainland. Causeways for road and railway (III, Plate 107) and ferries link the city with these industrial suburbs. The Laguna Veneta, about 5 miles wide and 20 miles long from north to south, extends between the mouth of the F. Brenta in the south and the F. Sile in the north. The lagoon is separated from the gulf of Venice, about 1 mile to the east, by a chain of long, low, narrow, sandy islands and spits which from north to south are known as the Litorale del Cavallino (continuous with the mainland), the Litorale di Lido (Isola di Malamocco), the Litorale di Pellestrina, and the Litorale di Sottomarina with Chioggia (p. 377) near its northern tip: Between the four sand-bars are three inlets giving access to the lagoon, the Porto di Lido, the Porto di Malamocco, and the Porto di Chioggia. Inland the lagoon is bordered by the low Venetian plain.

The city of Venice lies near the junction of the *laguna viva* and *laguna morta* (I, p. 141), being itself mainly in the *laguna viva* area, though Porto Marghera is in a *laguna morta* zone. The city extends over about 120 islands, which owe their origin mainly to thirteen centuries of human ingenuity, most of the houses being built on wooden or concrete piles. These islands form a compact archipelago about 3 miles long from east to west and nearly 2 miles wide from north to south. They are divided into two unequal groups by the Grand Canal (*Canal Grande*), which runs through the city from

north-west to south-east, making two wide curves in the shape of an inverted S. It is, together with its north-western continuation, the Canale di S. Chiara, 4,250 yards long, 30–70 yards wide, and 16½ to 18 feet deep. The Grand Canal, which terminates at its south-eastern end in the Canale di S. Marco, is crossed by three bridges, the Ponte dell' Accademia, di Rialto, and della Stazione. About 45 *rii* or *rielli* (small canals), generally about 4–5 yards wide, branch from the Grand Canal and serve the rest of the city. These are spanned by about 400 bridges linking up the countless little alleys or *calli* which form the main routes for pedestrian traffic and lead to the larger squares (*campi*) and smaller courtyards (*campielli* or *corte*). Motor traffic crossing the causeway terminates in the western part of the city.

Most of the main part of the city is residential. The Rialto district, the original nucleus of Venice, remains an important centre of communications, but the civic, religious, and artistic centre is the Piazza S. Marco (S. Mark's Square). The Grand Canal is lined with palaces of the great Venetian families, but north of the Ponte di Rialto (towards the station) they tend to be used for commerce and as warehouses. The main industrial establishments in the city are in the west, generally north of the Grand Canal and near the station, though there are some south of it, especially around the Bacino di Stazione Marittima. The royal arsenal and its docks are at the eastern end of the city.

The eight islands of La Giudecca, forming a strip about 250–300 yards wide, lie to the south of the main part of the city, from which they are separated by the Canale della Giudecca (300–400 yards wide and 3,000 yards long). The islands of Sacca S. Biaggio and Sacca Fisola are to the west and the island of S. Giorgio Maggiore to the east of this compact group. La Giudecca, once a ghetto, is now an industrial suburb. Near the northern end of the Isola di Malamocco, the sand-spit immediately east of the city, is Venice's famous cosmopolitan bathing resort, the Lido, which is spaciouly laid out in a modern style with large hotels, villas, and fine gardens. At the extreme northern end of the island is the civil airport and some military establishments. Other inhabited islands near the main part of Venice include Murano, famous for its glass, and Burano. Various other small islands are used for hospitals, monasteries, arsenals, and cemeteries.

Mestre and Porto Marghera on the eastern fringe of the flat fertile Venetian plain are important industrial suburbs. Mestre, built on

firm land 13 feet above sea-level and about 3 miles inland from the lagoon, was the first to develop. Many important routes from the Northern Plain converge here before crossing the causeways to Venice itself. The original nucleus of Mestre is on the banks of the two branches of the F. Marzenego (since A.D. 1500 diverted by the Canale Osellino to the north end of the Laguna Veneta) and is built round two squares. The modern part of the town has expanded south-westwards towards the railway station along wide roads.

Porto Marghera, immediately south of Mestre and $2\frac{1}{2}$ miles from Venice, is built on the shores of the *laguna morta* and on recently reclaimed land to the south-west of the large star-shaped Renaissance Forte Marghera. The numerous industrial establishments of Porto Marghera are for the most part built immediately to the north and west of the intricate harbour basins which are excavated in the reclaimed swamp. Farther west still, to the south of the railway, is the garden city of Porto Marghera, which is planned as a group of piazzas linked together by radiating streets. The Venetian plain to the north and west of Mestre and Porto Marghera is intensively cultivated, mainly with market gardens. To the south of Porto Marghera much of the marsh is, however, still undrained and swampy.

History

Venice was founded by refugees from the mainland fleeing before the barbarian invaders. At first they returned to the mainland when the invaders' force was spent, but after the Lombard conquest they made a permanent home in the islands of the lagoons. The colonization, development, and defence of these islands by the settlers make up the early history of Venice. In 466 twelve tribunes were chosen, one from each settlement, and these formed the government until the appointment of the first Doge in 697. Supreme authority, however, was recognized as lying with the Byzantine Emperor and his representative in Italy, the Exarch of Ravenna. In the sixth century, in recognition of the help given by Venetian ships in transporting a Byzantine army to Ravenna, masters were sent from Constantinople to build a church dedicated to St. Theodore on the island of Rivoalto; this island became in course of time the centre of the whole community, and here the first palace of the Doge was built. On the coming of the Franks the Venetians made their dependence on the Eastern Emperor a pretext for refusing submission to Pepin and Charlemagne. After a fierce struggle they emerged victorious, and the position of Venice as a free republic, the ally rather than the vassal

of Constantinople, was established. In 828 some Venetian traders stole the body of St. Mark from Alexandria and brought it to Venice, where a chapel adjoining the Doge's palace was built to receive it. Henceforth St. Mark replaced St. Theodore as the patron of Venice, and the lion of St. Mark became the emblem of the republic.

Her connexion with the East and the possession of a fleet were contributing factors in the process which made Venice one of the principal centres of medieval commerce. By the close of the tenth century Venice had established her control over the Adriatic and Pietro Orseolo II (992-1009), one of the ablest of her Doges, assumed the title of Doge of Dalmatia. In the course of the first three Crusades Venice developed her carrying trade and acquired commercial bases in the Syrian ports. A signal proof of the supremacy to which the republic had attained was given in 1177, when Pope and Emperor met in Venice to make peace after Frederick Barbarossa's defeat at the hands of the Lombard communes, and Alexander III presented the Doge with a consecrated ring saying 'Receive this as a pledge of sovereignty which you and your successors shall have over the sea'. From this time until the fall of the republic there took place every Ascension Day the celebrated pageant known as the *Sposalizio del Mare* or wedding between the Doge and the sea. At the beginning of the fifteenth century Venice was at the apex of her commercial supremacy. Under the short-lived Latin Empire at Constantinople (1204-1261) she had built up a dominion in the Levant. The naval power of her great rival Genoa was in decline. Every year six fleets set out from the state arsenal for the Black Sea, Greece, and Constantinople, the Syrian ports, Egypt, the Barbary coast, England, and Flanders. Their cargoes made Venice an emporium of the world's merchandise and the resort of traders from every part of Europe.

Second only to her commerce as a basis of Venetian power was her stable and efficient constitution. After the closing of the Grand Council, effected between 1296 and 1319, this sovereign assembly was composed solely of the sons of those patrician families whose names were written in the Golden Book. The main function of the Grand Council was elective, and as all magistracies were elected for short periods, every member of the council had his share of responsible office in the course of his career. Legislation and decisions on matters of policy were the work of the Senate. The Collegio, or executive, consisted of the heads of departments and six Savii Grandi, one of whom acted as the chief minister of the republic for a week at a time. At the apex of the constitution came the Doge and his six councillors,

who had the right of entry into every council. The Doge was elected for life by a complicated system of ballot and lot, designed to eliminate any opportunity for the exercise of personal or party influence. His authority was strictly constitutional, as he could not act apart from his councillors. The famous Council of Ten was first appointed in 1310 'to preserve the liberty and peace of the subjects of the Republic and to protect them from the abuses of personal power'. Elected in the Grand Council for a year at a time, the Ten had wide discretionary powers in all matters affecting the safety of the republic. It provided, within the framework of the constitution, the element of strength, swiftness, and secrecy which other Italian states only secured through submission to a despot. Its more sinister features of secret arrests and prisons, from which none came out, have earned it an ill-name; but these belong rather to the period of Venice's decline, when the city lived in dread of losing its liberty and the atmosphere was one of plot and counter-plot dominated by terrorism. During the great days of the republic the plebeian classes in Venice and the inhabitants of the subject cities alike recognized that the rule of the oligarchy was in the interests not of a single class but of the whole community, and were steadfast in their loyalty. As compared with other cities, torn by faction, and the victims of alternating despotism and revolution, the prosperity and content of the Venetian dominions justified the saying that Venice alone among Italian states possessed the art of government.

From the fall of Constantinople (1453) Venice was engaged in a struggle with the Turks which went on intermittently until, in 1718, all that was left of her vast empire in the Levant were the island of Corfu and a few fortresses in Dalmatia. The dominion which she built up for herself on the Italian mainland in the course of the fifteenth century involved her in wars with her neighbours which culminated in the War of the League of Cambrai (1508-1510), when the leading European Powers made a united attack upon her. Her defeat at Agnadello (1509) forced her back to the lagoons, but the loss of her mainland territories was only temporary, and within the next few years the greater part of them were recovered. The war, however, placed a strain on Venetian resources at a time when the republic was called upon to face the supreme crisis in its history. The discovery of the Cape route to India enabled the Portuguese to break the Venetian monopoly of the spice trade, and brought about a shifting of the trade paths which destroyed the commercial system upon which the prosperity of the republic was based. There was no recovery from

this blow. Venetian patricians, who had hitherto been engaged on commercial enterprises at sea, now lived in idleness on their mainland estates and their growing poverty made them an easy prey to political intrigue. In the eighteenth century Venice had ceased to be a great power and had become the playground of Europe, famed for her theatre, her pageants, and her gay, luxurious life. Napoleon in 1797 had only to administer the *coup de grâce* to a dying republic. By the Congress of Vienna, Venice was assigned to Austria, and it was not long before her aspirations after independence found expression in Daniele Manin. In 1848 he was released from prison by a popular rising and succeeded in driving the Austrians from the city. Venice was a republic once more, and when after a year's heroic defence it had to yield to the Austrian forces, Manin from his exile worked with Cavour for the day of final liberation. This came in 1866, when Austria, to save her face after her defeat by Prussia at Sadowa, handed over Venice to France. Whereon the citizens voted themselves into the kingdom of Italy.

The church in Venice was originally subject to the Patriarch of Grado, but in 1456 the patriarchate was transferred to Venice, and the church of S. Pietro di Castello, hitherto the seat of a suffragan bishop, became the cathedral. S. Marco was the Doge's palatine chapel until, in 1807, the patriarchal see was transferred there, making it the cathedral of Venice.

Public Buildings and Monuments

The centre of Venetian life is the Piazza di S. Marco, round which and the adjoining Piazzetta, are grouped buildings of peculiar beauty and interest. At the eastern end of the Piazza is the basilica of St. Mark, representing in its present form an eleventh-century rebuilding of the ninth-century church, in which the body of the saint was laid. The oriental magnificence of its gilded domes, the many coloured marbles of its columns, and the rich hues of its mosaics produce, both within and without the building, an effect of unsurpassed splendour. Among features of special interest are the four bronze horses over the central doorway which were brought from Constantinople in 1204, and were carried off by Napoleon to Paris, from whence they were returned in 1815. The mosaics of the Story of Genesis in the atrium, dating from the twelfth century, are probably the oldest in the church. The Pala d'Oro behind the high altar, glowing with precious stones, enamel, and old gold, was made in Constantinople in 1105 to the order of Doge Ordelaaffo Falier and was enriched by later Doges

in 1209 and 1345. On the north side of the Piazza is the Torre del Orologio (1496-1499), with an arch leading into the Merceria (the chief shopping street of Venice) and above it the great clock on which bronze figures strike the hours. Opposite is the campanile, built in the twelfth century, with a graceful Loggia by Sansovino (1540) at its base. In 1902 this great edifice suddenly collapsed, doing miraculously little injury to the surrounding buildings. The Venetians at once decided to rebuild it as it was before, and on St. Mark's day 1912 the new campanile was dedicated. An amazing feat of reconstruction had been accomplished, but it remains a subject of debate whether the Piazza looked better with or without its campanile. The Piazzetta is flanked on one side by the Doge's Palace and on the other by the Old Library of St. Mark, a masterpiece of Sansovino. At its southern end, near the edge of the lagoon, are two monolithic columns brought from the East and erected in the twelfth century; one is surmounted by a winged lion, the other by a statute of St. Theodore, the first patron of Venice. Between the columns was, in medieval times, the place of execution for criminals. The first Doge's Palace was begun in 814, but the present building dates mainly from the fourteenth and fifteenth centuries, and is one of the most beautiful examples of Italian Gothic. The spacious halls of the interior are decorated with frescoes, commemorating the glories of the republic, by Tintoretto, Veronese, and other leading Venetian painters (II, Plate 12).

Venice has a wealth of interesting churches, among the most important being the Franciscan church of Sta. Maria Gloriosa dei Frari, and the Dominican Church of SS. Giovanni e Paolo, known to the Venetians as S. Zanipolo; both date from the thirteenth century. The Frari has some very fine pictures, including one of Giovanni Bellini's most delightful Madonnas, and Titian's great Assumption over the high altar. S. Zanipolo is remarkable for its splendid tombs of the Doges, and for Verocchio's statue of Colleone in the Piazza. L'Accademia di Belle Arti contains a great collection of Venetian pictures, dating from the fourteenth-century primitives, through the era of Bellini, Carpaccio, and Titian, to Tiepolo and the eighteenth century. Of the three bridges which span the Grand Canal only that of the Rialto (1588-1592) is of historic interest. The Bridge of Sighs (1600), crossing the Rio which divides the Doge's Palace from the state prisons, has acquired a reputation which exceeds either its artistic or its historic importance. The palaces lying on either side of the Grand Canal cannot be described individually; in general they constitute the glory of Venice. The arsenal, which already in Dante's day was a

busy scene of Venetian shipbuilding, is entered through a fine Renaissance portal. Within is a Museo d'Armi, where may be seen the last 'Bucentaur', or state ship used for the ceremony of the Sposalizio del Mare.

The islands of the Venetian lagoon have many features of interest. Murano has been since the thirteenth century the principal centre of the Venetian glass industry. Torcello, once Venice's rival and now a deserted village, has a very fine Byzantine cathedral, dating from the seventh century.

Industry

Venice is primarily a tourist centre and the only heavy industry at Venice itself is shipbuilding. The shipbuilding yard on Giudecca builds small naval craft and turbines for hydro-electric plants, whilst the Royal Arsenal also has building slips. Glass-making is a traditional industry of Venice and there is still a large production of artistic blown glass, especially on the island of Murano, though small glass factories are scattered throughout the main part of the city. Hand-made lace, rich cloths, and embroidery are also important locally made articles for the tourist and export trade. Finally there are some large flour-mills and pasta factories.

Porto Marghera is a notable centre of the metallurgical and engineering industries. The Ilva steelworks have an annual capacity of 50,000 tons of crude steel, and the Societa Industriale San Marco produces ferro-silicon. The two alumina plants each have an annual capacity of 80,000 tons, whilst there is also an aluminium reduction plant with an annual capacity of 26,000 tons. The Lavorazione Leghe Leggere S.A., a Montecatini subsidiary, produces a full range of aluminium products and has a peace-time staff of about 800. Sardinian zinc is refined electrolytically by the Societa Italiana del Piombo e Zinco, whose plant has a capacity of 13,000 tons of metal a year. The Cantieri Breda is the principal engineering establishment. Recent construction in this yard has included merchant vessels and naval escort vessels. Up to about 800-1,300 men are normally employed in these yards. Various other notable establishments make precision instruments (S.A. Galileo), files and rasps, metal fittings, wire, wire-netting and metal pipes, watches and clocks, whilst there are also railway repair workshops and telephone workshops. Porto Marghera is an important centre for the chemical industry. The Vetrocoke company, which has a coke-oven plant with an annual coking capacity of 500,000 tons, also has the second largest nitrogen-fixation plant in

Italy, with an annual capacity in terms of nitrogen of 35,000 tons. Nitrogen products, including nitric acid, fertilizers, and ammonium nitrate are produced at this plant in addition to sulphuric acid, ammonium sulphate, and ethylene. The S.A. San Marco Elettro-Metallurgica is the second largest carbide producer, having an estimated annual capacity of 100,000 tons and employing about 450 persons. The other large chemical plant at Porto Marghera belongs to the Montecatini combine and mainly produces superphosphates and sulphuric acid. Other firms make copper sulphate and various other insecticides. The S.A. Vetrococo also makes glass, and is the largest manufacturer of plate glass in Italy, besides making cut glass, glass-wool, and optical glass. There is also an important paint factory making enamels, varnishes, and paints for marine uses, a soap factory, sulphur refinery, and tar distillery, as well as an A.G.I.P. oil refinery at the port (Appendix II).

The food-processing industry includes flour mills, pasta factories, and several canneries, one belonging to S.A. Cirio. Various building materials are also made.

Description of Port

The Laguna Veneta is protected from the sea by three low narrow islands which are, from north to south, the Litorale del Cavallino, the Litorale di Lido, and the Litorale di Pellestrina. The three entrances to the lagoon lie to the south of each island, and within is a network of canalized channels. Venice itself, with its naval dockyard and passenger and commercial quays, has been built on a group of small islands just north-west of the north end of the Litorale di Lido: Porto Marghera lies on the mainland $2\frac{1}{2}$ miles to the north-west and is the industrial port. Both are administered by a body known as the *Provveditorato del Porto*.

Although the approaches to Venice are unobstructed, care must be taken when nearing the shore, since shallows extend for some way out. Anchorage outside the lagoon is very exposed, but the best is off the Litorale del Cavallino. Anchorage is possible within the lagoon just inside each entrance, but is restricted and liable to block the fairway.

Of the three entrances the southernmost, the Porto di Chioggia, is narrow, shallow, and intricate, and is, therefore, of use only to local vessels. The other two entrances, the Porto di Malamocco and the Porto di Lido, are respectively to the south and north of the Litorale di Lido: both are protected by parallel breakwaters projecting south-east on either side of the channel. The former is 470 yards wide with

least depths of 25 feet in the fairway, but the passage is narrowed at its inner end by a breakwater projecting north from the north end of the Litorale di Pellestrina. Canals lead northwards inside the Litorale di Lido to Venice, but they are not greatly used for they are narrow and tortuous, and tidal currents are strong. The Porto di Lido, which is the main entrance of the port, is 980 yards wide, with depths of $29\frac{1}{2}$ feet over a fairway 360 feet wide, and of $32\frac{3}{4}$ feet in mid-channel. The channels westwards to Venice have depths of about 30 feet, but navigation is difficult, for shoals are frequent and the tidal set is often considerable.

Apart from the main quays on the south shore of Venice and at Porto Marghera, there are several groups of outlying quays and jetties. The Canale Rocchetta leads northwards from Porto di Malamocco to the oil pier and lighter jetties beneath Forte Alberoni, on the south end of the Litorale di Lido, and to Poveglia, the quarantine station 3 miles to the north, where there is a steamer quay (alongside depths of 25 ft. or more) and a turning basin. From the Porto di Lido the Canale di Treporti gives access to several lighter quays on Burano island. On the north side of the channel leading to Venice, the Canale di S. Nicolo, the island of Le Vignole has on its east the S. Andrea seaplane station, which consists of a long rectangular basin with several slipways and hangars. On the opposite side of the channel, that is, on the north-west of the Litorale di Lido, there are more lighter jetties and an oiling berth north-west of the air port, and, $1\frac{1}{2}$ miles farther south, landing stages for the ferries from Venice to the bathing resort of the Lido. Branching north-west from the Canale di S. Nicolo, on the east of Venice, the Canale dei Marani gives access to the island of Murano, whose quays can be used by lighters and small coasters, and to the Canale delle Fondamenta Nuove, which skirts the north side of Venice and is quayed on its south side for most of its length. South of the town are the islands which together make up La Giudecca, and the island of S. Giorgio Maggiore. The former is quayed on its north shore with off-lying piles for berthing at several points, while at the east end and on the south side are several ship yards: the latter has a rectangular basin on its east and the quay on its north is protected by a detached breakwater with curved ends. None of these quays and jetties have road or rail connexion with Venice, although foot bridges join the quays of the Canale delle Fondamenta Nuove to the rest of Venice.

In *Venice* the harbour facilities are on the east, the south, and the west of the city. On the east, approached by the Canale dei Marani, is

the Royal Arsenal (1), the naval dockyard. The entrance channel, the Canale di Porta Nuova, 82 feet wide and 17 feet deep, leads to a large basin, the Darsena Grande, on whose quays are slipways, workshops, and warehouses. From the south-west corner a passage leads to a narrow basin, known as the Darsena Vecchia, which backs the main basin on the west, while on the shore to the north-east of the entrance there are three graving-docks. On the south of the city the Canale di S. Marco and della Giudecca, continuing the Canale di S. Niccolo westwards, form the principal traffic artery of the port, with depths of 16 feet charted between a width of not less than 240 yards. The quays on the north shore of the Canale di S. Marco are used by passenger steamers and local ferries. The piles off Punta della Salute at the mouth of the Canal Grande form a berth for small craft, and midway along the north shore of the Canale della Giudecca is the principal passenger terminal, the T-shaped Pontile Lloyd Triestino. To its west several contiguous quays lead to the Canale Scomenzera, which is 55 yards wide with quayed sides and depths of 21 feet at its south and 10 feet at its north end. These quays have road and rail connexion with the mainland and, together with the Bacino di Stazione Marittima to their west, are the principal commercial quays of the port. The Bacino di Stazione Marittima (2) is a large rectangular basin, 790 yards long and 195 yards wide, with a least depth of 20 feet, lying between two quayed moles built south-west from a triangular area at its head. The eastern mole, Molo di Levante, is at present the more developed. To the west of the western mole, the Molo di Ponente, is the Nuovo Bacino which has recently been dredged to depths of 23 feet or more. From its northern end a channel leads north-eastwards along the Banchina Fluviale, the quay that lies on the north-west of the triangular area at the head of the Bacino di Stazione Marittima. The whole of this area is bounded on the north by the Canale di S. Chiara, the western continuation of the Canal Grande, and both the Banchina Fluviale and the Canale Scomenzera connect with it under the Ponte del Littorio, the road linking Venice with the mainland. The Fondamenta S. Lucia fronting the main station is quayed for local ferries.

Berthing is alongside all quays, but lighters are used for discharge from ships moored to the many piles and mooring buoys. Quay heights are variable: they are from 3 to 5 feet on the north side of the Canale della Giudecca, 6 feet in the Regio Arsenale and along the north side of the Canale di S. Marco, $6\frac{1}{2}$ to 7 feet along the west end of the north side of the Canale della Giudecca, 7 or 8 feet in the

Bacino di Stazione Marittima (with certain parts of the north of the west side of the Canale Scomenzera 11 feet high), and 6 feet on the Banchina Fluviale.

Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
<i>Regio Arsenal (Royal Arsenal)</i>				
Darsena Grande . . .	..	..	..	Entrance canal, C. di Porta
East side . . .	19	656	2	Nuova, in north-east corner.
South side . . .	12	770	—	Passage, with swing bridge,
West side . . .	..	410	—	in south-west corner to Dar-
North side . . .				sena Vecchia (1,310 ft. long,
West end . . .	14	262	—	165 ft. wide, divided into
East end . . .	17	524	1	two by sliding bridge). Two
				slips in north-west and two
				covered slips in north-east.
				Surrounded by workshops,
				stores, &c. 160-ton crane
				on east quay projects c. 35 ft.
				North quay divided by pro-
				jection 140 ft. long and
				26 ft. wide.
<i>Canale di San Marco</i> . . .	..	..	..	Quays separated by canal
				mouaths crossed by humped
				foot-bridges.
Riva dell' Impero . . .	14-32	1,210	—	Passenger liners.
Banchina S. Biagio . . .	26	285	—	Passenger traffic.
Banchina Forni . . .	< 19	360	—	Passenger traffic.
Riva degli Schiavoni . . .	..	1,740	—	Ferries and pleasure craft
				berth at heads of many
				small piers.
<i>Canale Della Giudecca</i> . . .	..	..	..	Vessels lie between 75 and
				150 ft. off moored to piles.
South side				
Fondamenta S. Giovanni	..	426	—	Oil.
Fondamente delle Zitelle				
and della Croce . . .	..	1,410	—	..
Fondamenta S. Giacomo	..	1,140	—	Ships refitting.
Fondamente Ponte Lungo				
and Ponte Piccolo . . .	..	1,427	—	..
Fondamenta S. Biagio . . .	..	1,280	? 1	Grain, flour, and beer.
North side				
Pontile Lloyd Triestino . . .	29½	245	—	T-head 33 ft. wide and 67 ft.
				from shore. Passenger traffic.
Calata di S. Basilio . . .	24½	565	5	..
Calata del Punto Franco	> 17	640	3	Refrigerated goods.
Calata dei Magazzini				
Generali . . .	19½-21	1,140	6	Cotton.
Calata di S. Marta . . .	20-29	426	2	..
Canale Scomenzera				
East side . . .	5½-14	2,256	—	South-end part of C. di S.
				Marta. Two truck ferry
				bertha.
West side . . .	10½-19½	2,300	12	East side of Molo di Levante.
				Grain at south end.

Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
<i>Bacino di Stazione Marittima</i>				
Molo di Levante				
Head	25	300	3	Grain by elevators to silo behind.
North-west quay . . .	16-20	2,065 + 180 + 140	12	Grain by elevators at south-west end. At north-east end is a step offset c. 50 ft. and a ramp offset a further 50 ft.
Banchina di Palazzo . .	24	528	4	Cotton. Old quay 4 ft. higher back 35 ft.
Molo di Ponente				
South-east side . . .	22-29	2,385	10	Cotton and jute.
Head	24-29	738	1	Marble slabs.
North-west side . . .	19-22	2,820	8	..
Banchina Fluviale . . .	11	1,280	2	..

Porto Marghera is approached from Venice by the $2\frac{1}{4}$ -mile long Canale Vittorio Emanuele III, which has been dredged north-westwards from the head of the Molo di Ponente. The channel has a bottom width of 130 feet and least depths of $32\frac{3}{4}$ feet. About half-way along it the Canale delle Tresse, with a width of 100 feet and least depths of about $12\frac{1}{2}$ feet, branches west to give direct access to the southern basin of Porto Marghera, the Canale Industriale Ovest. Approximately $1\frac{1}{4}$ miles from Venice the Canale Vittorio Emanuele III runs between two moles some 300 feet apart, and this may be considered the true entrance of Porto Marghera.

The port consists of several reclaimed areas built with the soil dredged from the intervening canals and basins. Immediately inside the entrance on the north side of the Canale Vittorio Emanuele III is a double rectangular basin, the Porticciuolo dei Petroli, and north-west of it a second oiling (Dicsa) basin. At the north-west end of the canal is a wide turning basin (3) from which radiate, northwards the Canale Brentella, north-west the Canale Industriale Nord, west-north-west the Bacino No. 1, and southwards the main approach to the Canale Industriale Ovest.

The Canale Brentella, whose eastern bank is lined by petroleum depots (Appendix II), has a turning basin at the north end, whence a barge canal leads northwards under the Mestre-Venice road and railway bridge to connect with the Canale Salso. This canal, which is also approached from Venice by the Canale S. Secondo and the Canale Nuovo (Militare) close north of the Mestre-Venice highway, skirts the south and west of the Forte Marghera, and then runs north-west to connect with the inland waterways to

Padua and Vicenza. About 1,000 yards north-west of Forte Marghera a dead-end branch leads south-west to some cotton warehouses.

The Canale Industriale Nord has a turning basin midway along its south side and another on the north side at its north-west end off the Breda shipyard.

The Bacino No. 1 also has a turning basin at its north-west end, and on its south side is the main coal wharf. Further development of the port envisaged a similar basin immediately south of Bacino No. 1, but in 1943 construction had apparently been abandoned.

The Canale Industriale Ovest, approached by the channel running south from the entrance to Bacino No. 1, leads north-west and north in two arms on the south and west of the former basins. A barge canal passes under a road and railway bridge to connect the turning basin at its north end with the terminal basin of the Canale Industriale Nord. At the junction of the southern and western arms the Canale di Raccordo col Naviglio di Brenta runs west-south-west to connect with the inland waterways leading to Padua.

Most of the banks of these canals and basins are sloped. Along them there are many modern discharge plants for the bulk cargoes dealt with here, and numerous jetties, alongside which berth the ships serving the industrial establishments behind.

<i>Name</i>	<i>Length (feet)</i>	<i>Width (feet)</i>	<i>Dredged Depth/ Width (feet)</i>	<i>No. of Jetties</i>	<i>Quays (feet)</i>	<i>Remarks</i>
<i>Porto Marghera</i> Porticciuolo dei Petroli Inner basin	720	330	—	2	720 + 310 + 720	Separated from outer basin by floating boom. Depths in basin 21-27½ ft. Oiling berth for NAFTA and SIAP. Pipe-lines on jetties.
Dicsa basin	570	250	—	3	250 + 650	West side stepped. Oiling berth. Jetties on east side, pipe-lines on longest.
Canale Brentella	4,500	230 +	23/130	20	650 + 360, 450	Banks sloping, quays vertical, c. 7 or 8 ft. high. Many jetties have T-heads and most of 11 on east bank have pipe-lines. East side, petroleum depots; west side, Stereol hydrogenation plant, Vetrocoke, Feltrinelli timber yard, and petroleum depots. Turning basin at north end, with barge passage under bridge north to C. Salso.

<i>Name</i>	<i>Length (feet)</i>	<i>Width (feet)</i>	<i>Dredged Depth/ Width (feet)</i>	<i>No. of Jetties</i>	<i>Quays (feet)</i>	<i>Remarks</i>
Canale Industriale Nord	7,500	295 +	20 + / 175	19	400 + 500, 1,500 + 1,300 + 600	Banks sloping, quays vertical, c. 8 ft. high. Of jetties, 17 on north side, many with T-heads. Most quayage on south side. Turning basins half-way along south side and off shipyard at inner end. Barge passage under bridge west to north end of C. Industriale Ovest. North side, hydrogenation plant, Vetrocoke, Montecatini, Soc. It. del Piombo, Cantieri Breda (with slips, and 2 dry docks under construction); south side, salt and tobacco warehouses. Leghe Leggere aluminium, and Ilva steel works. Twenty-six lifting appliances on canal banks, cranes, telfers, suction elevators, and transporters.
Bacino No. 1	3,300	350 +	—	2	1,260 800 + 3,280	Banks vertical, except on north side, south-east end. Turning basin at north-west end. Depths 26-27½ ft. South side, main coaling quay with 12 lifting appliances, of which 5 are transporters.
Canale Industriale Ovest						
Southern leg	6,000	c. 300	?27½/ 92 +	—	—	Southern arm not yet developed. Banks sloping and c. 8 ft. high, many berths on off-lying piles. C. di Raccordo Col Naviglio di Agentia branches west-south-west at junction of two legs. Turning basin (450 ft. × 810 ft.) at north end of western leg and barge channel eastwards under bridge to C. Industriale Nord. Of jetties, 12 on west side serving San Marco works, Soc. Adriatica di Elettricità, Soc. Alluminio Veneta An., Chiari e Forti silos, Riseria Italiana, Bottacin, Cirio, and Cledca tar distillery; on east side, Tagliabue oil depot and Vetrocoke.
Western leg	6,300	328	?27½/ 197	15 and 1 pier	550	

A further extension of the harbour facilities is projected south of the southern arm of the Canale Industriale Ovest.

The industrial establishments and petroleum depots were heavily bombed in 1944.

Facilities. The customs-house at Venice is on the Punta della Salute at the junction of the Canal Grande and the Canale della Giudecca. The harbour-master's office is on the shore of the Canal Grande due north of the customs-house.

In addition to a very large number of ferries and launches used on the canals of the city and for the inter-island services, there are numerous tugs and lighters, and special wagon-lighters. Railway wagons are shunted on to these lighters by special equipment in the Canale Scomenzera, and ships discharge directly into or load directly from these wagons when tied up alongside.

In Venice most cranes are electric, jib, travelling, portal cranes. Apart from those in the naval dockyard, they are all on the quays in the south-west of the city. In Porto Marghera there are a few cranes along the Canale Brentella, but the other three basins have in great variety a large number of modern lifting appliances, conveyors, gantries, jib cranes, suction elevators, telfers, and transporters, designed for handling bulk cargoes and for the ship building and repairing in the Breda yard.

Most of the warehouses are at Venice, since the cargoes of Porto Marghera are mostly non-perishable industrial raw materials. The main concentrations at Venice are on the north shore of La Giudecca, round the Darsena Grande of the naval dockyard, and on the quays in the south-west. These latter have a total storage space which is in the neighbourhood of 1,120,000 square feet: they number at least 30, and include on the head of Molo di Levante 3 grain stores and a large silo whose capacity is 35,000 tons of cereals, and on the Banchina di Palazzo and the Molo di Ponente 5 special cotton warehouses. At Porto Marghera there are known to be 3 warehouses with about 200,000 square feet of space, and many of the industrial buildings could be used for storage.

Before 1934 coal was stored at Venice on the Molo di Ponente, but since then only small stocks for local industries have been maintained at Venice, and the main store is at Porto Marghera on the south bank of the Bacino No. 1, whence supplies are transferred by lighters to Venice on demand. This main dump covers an area of 65,000 square yards. Most of the firms have their own stocks, and of these two are outstanding—Vetrocoke, with an area of 16,000 square yards on the

north side of the Canale Industriale Nord, and the Societa Adriatica di Eletticità, with an area of 6,000 square yards on the west side of the west arm of the Canale Industriale Ovest. There is comparatively little oil stored except at Porto Marghera (Appendix II).

Both Venice and Porto Marghera are well supplied with water. At the former there are hydrants on the Calate di S. Basilio and dei Magazzini Generali and on the Moli di Levante and di Ponente: at the latter hydrants are reported on the north side of the Canale Industriale Nord at the Montecatini works, on the south-east end of the south side of the same basin, and in the Bacino No. 1 on the coal wharf and the quays at the north-west end. Since the harbour is of recent construction hydrants are probably more numerous. Electric light and power are available in the naval dockyard, and all the quays at Venice are lit by electricity. Light and power are available at all berths in Porto Marghera.

The repair facilities are concentrated in three areas—the naval dockyard at Venice, the south side of La Giudecca and of Sacca S. Biagio, and the Cantieri Breda at Porto Marghera—and between them they are capable of undertaking all repairs to ships of any size. At Venice the naval dockyard has 6 slipways and extensive workshops. The dimensions of the three graving-docks are as follows:

<i>Name</i>	<i>Extreme length ft. in.</i>	<i>Length inside, caisson to coping head ft. in.</i>	<i>Coping width at entrance ft. in.</i>	<i>Width at entrance ft. in.</i>	<i>Depth on sill ft. in.</i>	<i>Depth on blocks at entrance ft. in.</i>
No. 1. Maggiore .	526 3	498 8	78 5	79 8	29 6	26 1
No. 2. Minore .	298 9	272 3	55 1	58 4	19 7	16 7
No. 3. Principe di Piemonte .	820 2	810 4	117 8	117 7	39 3	36 0

The small yards on S. Pietro and on S. Elena islands each have a slip and workshops for the building and repair of small craft. On La Giudecca and Sacca S. Biagio there are 6 yards with at least 15 slips and workshops; that in the centre of the former and that at its west end are larger and capable of more extensive repairs than the rest. In 1943 a graving dock was apparently being constructed to the west of Sacca S. Biagio. In Porto Marghera there are at the Cantieri Breda 8 building slips, 2 fitting-out wharves with shops and stores adjacent, a testing basin, numerous other shops, and factories for shells and small arms. Two graving-docks are under construction, respectively about 630 feet and 400 feet. There is a slipway on the west side of the turning basin

midway along the Canale Industriale Nord, and two dry docks are under construction immediately to the south of the entrance to the Bacino No. 1.

The Laguna Veneta is crossed by a complex network of canals, which give access to others serving different parts of the Northern Plain (III, p. 493). All communication between the islands of the lagoon is by water, but Venice is connected to the mainland by a road and rail bridge $2\frac{1}{2}$ miles long from the north-west of the island. Only the quays west of the Pontile Lloyd Triestino have direct access to this bridge. The main railway station is at the west end of the Canal Grande and north of its westward extension, the Canale di S. Chiara. The harbour lines strike south from a point close west of it, cross the mouth of the Canale di S. Chiara by a double-track bridge, and fan out through the marshalling yards in the area at the head of the Bacino di Stazione Marittima on to the Moli di Ponente and di Levante, and down the east side of the Canale Scomenzera to the Banchina di S. Basilio. On each of these there are numerous tracks in front of and between the warehouses, and most of the quays have lines along their faces. Electric capstans are used to move rolling stock. The landing for wagon-lighters is midway along the east side of the Canale Scomenzera.

The Ponte del Littorio leaves the railway line west of the main station and passes to the town on bridges and a causeway between the Bacino di Stazione Marittima and the south bank of the Canale di S. Chiara. From this causeway two ramps have been constructed, one on either side of the harbour railway branch. The western ramp leads to the Molo di Ponente and the Banchina Fluviale, while the eastern ramp leads to the Molo di Levante, and, by a bridge across the head of the Canale Scomenzera close south of the railway bridge, to the east side of that canal and the quays on the west end of the Canale dell Giudecca.

At Porto Marghera railways serve all basins except the Bacino No. 1 on its north side. The harbour line leaves the Mestre-Venice line just east of Mestre station and bifurcates, each fork branching again into two. The eastern main fork fans out to the Breda shipyard and to the factories between the Canali Industriale Nord and Brentella, while it sends its second branch alongside the main railway as far as the north end of the Canale Brentella, across the barge canal leading to the Canale Salso, and then south to the petroleum depots. The western main fork sends one branch down the west side of the western arm of the Canale Industriale Ovest, and the other across the bridge between the head of that canal and that of the Canale Industriale

Nord, thence to fan out to the establishments along the east bank of the former and the south bank of the latter, and to the coal wharf on the south side of the Bacino No. 1. The roads largely parallel the railway lines, sharing the same bottlenecks at the head of the Canale Brentella and the head of the Canale Industriale Nord, and crossing them in the north-west by viaducts. The west side of the western arm of the Canale Industriale Ovest has, however, direct access westwards to the main road south-west from Mestre.

Trade and Connexions. The majority of the lagoon services are run by the Azienda Comunale per la Navigazione Interna Lagunare, and start either from the main station or from the Riva degli Schiavoni on the north of the Canale di S. Marco.

Shipping statistics for foreign trade are as follows, the figures in all cases being for Venice and Porto Marghera combined:

	1938	1939
Ships entered, number	6,271	6,088
Ships entered, tonnage	5,679,000	5,332,000
Ships cleared, number	6,170	6,079
Ships cleared, tonnage	5,616,000	5,382,000
Goods landed, tons	3,568,000	3,826,000
Goods loaded, tons	800,000	965,000

The volume of trade is shared about equally by the two ports, Venice handling most of the cotton, cereals, and miscellaneous cargoes, and Porto Marghera the oil, coal, ores, and chemicals.

In 1939 the principal imports were, in order, coal and coke (50% of the total), mineral oil (25%), phosphates, cereals, cotton, metallic minerals, fertilizers, timber, and oil seeds. The main exports in 1938 were textiles and yarn, mineral ores, cereals and flour, mineral oil, sugar, coal and coke, manufactured metal goods, and wine. The local and transit trade also assume considerable proportions.

The passenger traffic is almost exclusively confined to Venice. The numbers disembarking and embarking were respectively 60,361 and 52,315 in 1938, and 42,822 and 49,251 in 1939. In addition to the 7 foreign lines that call, Venice is a port of call for most of the Italian lines from Trieste and it is the terminus for the following services: twice weekly to Trieste, Pola, Zara, Spalato, and Gravosa; weekly to Trieste, Pola, Zara, Yugoslav and Albanian ports, Brindisi, and Bari, to Trieste, Fiume, Zara, Spalato, Gravosa, and Bari, to the Piraeus, the Aegean islands, and Rhodes; every ten days, two coastal services to Naples and Genoa; fortnightly to Bari, Brindisi, Rhodes, and Alexandria; and, irregularly four times a month, to the south Italian ports, Naples, Leghorn, and Genoa.

Inland Communications

Railways. Double-track lines run from Venice to (1) Milan (via Padua), (2) Bologna (via Padua), (3) Trieste, electrified from Cervignano, and (4) via Treviso to Udine (for Tarvisio and Vienna) and Gorizia. Single-track lines diverge from this last at Treviso for Calalzo-Pieve di Cadore via Belluno, and at Conegliano for Calalzo-Pieve di Cadore via Vittorio Veneto. At Venezia Mestre single-track lines branch off to Trento and Adria. Electric trolley buses (*filovie*) run from the Piazzale Roma to Mirano, Treviso, and Marghera.

Local Steamers. Steamers ply along the Grand Canal from the railway station to the Public Gardens, and from the Riva dei Schiavoni for the Lido and the Giudecca. There are also steamer services to Fusina (connecting with the electric tram to Padua), to Chioggia, Murano, Burano, Torcello, and other islands of the Venetian lagoon.

Roads. Road 11 runs from Venice to Milan and Turin, for most of the way to Padua it is duplicated by an autostrada. Road 13 goes to Udine and Tarvisio, and road 14 to Trieste and Fiume. Another main road leads to Castelfranco from Mestre.

Airways. The S. Nicolo Lido airport on the northern tip of the Litorale di Lido was formerly a calling-place on the following services: Venice-Rome direct; Venice-Rome-Bologna; Venice-Milan-Turin; Venice-Milan-Turin-Paris-London; Venice-Pola-Brioni-Fiume; Venice-Trieste; Rome-Venice-Budapest; Rome-Venice-Munich-Berlin; Rome-Venice-Trieste-Bratislava-Prague; Milan-Venice-Vienna-Budapest; Turin-Milan-Venice-Zagreb-Belgrade; and Rome-Venice-Budapest-Warsaw-Gdynia. The S. Andrea seaplane station was opposite the airport on the north side of the Canale di S. Nicolo.

Inland Waterways. Venice is in direct communication with the inland waterways of the Po basin, the Venetian plain, and of the Litoranea Veneta (III, p. 493).

MONFALCONE. Latitude $45^{\circ} 48'$ E. Longitude $13^{\circ} 32'$ N. Population 14,964.

Position and Site (Fig. 29)

Monfalcone, about $17\frac{1}{2}$ miles north-west of Trieste, is at the head of the bay of Panzano, which is the northernmost extension of the gulf of Trieste. The town is about $1\frac{1}{2}$ miles inland from its port, which has been artificially constructed in the north-eastern extremity of the lagoon delta zone (I, p. 34). The limestone plateaux of the Carso



Fig. 29. Montalcone

Tergestino rises immediately to the east of the town and port, whilst the low Venetian plain extends to the west. The outlying spur of the Carso rising immediately east and north-east of Monfalcone has a height of 283 feet at La Rocca, a summit crowned by a ruined castle overlooking the town, and reaches its highest point farther east at Cima di Pietrarossa (397 ft.). To the west of the town, flat alluvial reclaimed marshland, criss-crossed by drainage channels, extends northwards to the lower Isonzo and slopes gradually inland to 74 feet just south of Sagrado in the Isonzo valley about 6 miles from Monfalcone. The Isonzo forms a loop south-west of Sagrado and enters the sea at Point Sdobba, about 6 miles south of the port.

The town, which has recently been rebuilt after being destroyed by bombardment in the War of 1914-1918, is rather sprawling in shape and loosely knit, though most of the main roads converge on the Piazza del Littorio. The Canale Valentinis, which flows into the head of the harbour, divides the town in two. The older part is on the east bank, and the shipyards and newly built residential area on the west. These two parts of the town are connected by four bridges across the canal. The majority of the houses have gardens, though there are some blocks of workers' flats. The lighter industrial establishments are to the north of the town between the canal and the railway, whilst the heavier modern industrial establishments are near the harbour.

History

Monfalcone was a Roman colony and is mentioned by Virgil and Pliny. As part of the Patriarchate of Aquileia it came under Venetian rule in 1420, when the republic conquered Friuli. The fortress formed the outpost of the Venetian dominion and the garrison held out gallantly against the forces of the League of Cambrai (1514). After the fall of the republic it was acquired by Austria, who created shipbuilding yards there. It was the scene of much fighting, and was partly destroyed, in 1917-1918; at the end of the war it became Italian.

Public Buildings and Monuments

Monfalcone is a modern industrial city, with no public buildings of interest. The Rocca on the heights outside the town is of Roman origin; it was rebuilt by the Ostrogoths and strengthened by the Venetians. It is largely in ruins. The imposing cathedral has not long been completed.

Industry

Monfalcone has recently become an important shipbuilding centre, mainly because of its proximity to Trieste. It is also in a wine-growing and silkworm-rearing district, and is renowned for its sulphur baths. The chief industrial works in the town belong to the Cantieri Riuniti dell'Adriatico (C.R.D.A.; formerly the Cantiere Navale Triestino). This includes a large shipbuilding yard, an important aircraft factory, an electrical engineering works, and an establishment normally used for building and repairing railway wagons. Up to about 6,000 persons have been employed in the shipyard, where vessels of 25,000 tons have been built, 4,000 persons in the aircraft factory during the War of 1939-1945, and 600 workers in the railway wagon section. The principal products of the electrical engineering works are dynamos up to 900 kW. After the C.R.D.A. works the plant of first importance in Monfalcone is the 'Adria' chemical works, with a capacity of about 50,000 tons per annum, or 10% of Italian production of soda ash, whilst pharmaceutical bicarbonate of soda is also made. Other industrial establishments include a refinery for kerosene, asphalt, tar and pitch, a factory for tin and metal boxes and containers, a furniture factory, flour mills, an oil refinery for imported oil-seeds, cotton, silk, and wool textile mills.

Description of Port

The port of Monfalcone was developed by the shipbuilding firm of Cantiere Navale Triestino (now Cantieri Riuniti del'Adriatico) and the activities of the port are mainly concerned with the shipyard and aircraft works of this firm.

The harbour has been built on the swampy waste land at the head of the bay of Panzano and it is approached by a channel, the Canale Nuovo, which runs north-north-west for about $1\frac{1}{4}$ miles, is 262 feet wide, and is dredged to depths of 29 feet. Shoals on both sides make it necessary to navigate in mid-channel. The entrance to the harbour, about 390 feet wide, is between a low peninsula, the Riva Panzano, on the west, and an island on the east, beyond which are the parallel sea-walls of the Canale Vecchio, the old entrance channel, now closed to form a narrow basin.

The harbour may be divided into three parts. Leading north from the entrance is the Porto Rosega. From its northern end the Canale Valentinis curves about $\frac{3}{4}$ mile north-west to a basin immediately south of the town of Monfalcone. Westwards from the entrance is the Bacino di Panzano, separated from the Porto Rosega by a wide mole

and divided into three basins on its north side by two spits of land extending south-east from the north shore. The south shore of the Bacino di Panzano is quite undeveloped. The north-easternmost of the basins on its north side, the Bacino I, is quayed on its north-east side and at its head. Two floating docks, used mainly for submarines, are moored off the centre of the head, but the quays and their facilities have been designed primarily for the use of aircraft and to serve the aircraft workshops backing them. Depths in the basin are not great, but a channel with depths of 26 feet has been dredged from the Canale Nuovo along the east side. The two other basins, Bacino II in the centre and Bacino III to the west, are at present almost entirely undeveloped. The only quay in the former is a short one at its head used by ferries to Trieste, while the latter similarly has but one short quay in the north-east corner. A short jetty projects south-east from the north end of the west shore of the Bacino II, and a short pier is built out south-west from the centre of the quay in the Bacino III. Depths in the centre of both basins are considerable, but the approaches are shallow.

Much of the east side of the Porto Rosega is quayed, but the only facilities are on the Banchina Solvay, which, projecting slightly from the rest, serves the Adria chemical works. The main quays of the port are, however, on the west of this basin. Near their north end the main floating-dock is moored, and the principal building slips are also close at hand. Depths in the centre of the basin from 23 to 32 feet, with alongside depths of 10 to 26 feet.

The Canale Valentinis varies between 115 and 140 feet in width, with depths of 8 to 10 feet. The north-east bank is walled, but the south-west bank is rough, except for two fitting-out quays at the south end. At its north-west end the canal widens out into a rectangular basin, about 980 feet long and 250 feet wide, across which a road bridge has recently been built. The south-west side is walled, while the north-east side has a quay, stepped back for a short distance at its south-east end.

Two canals enter the harbour—the Canale Dottori, which enters the north-west end of the basin referred to immediately above; and the Canale del Brancolo, which enters the west side of the third basin of the Bacino di Panzano. The former is an irrigation canal developing hydro-electric power for the town: its outflow causes a considerable current in the Canale Valentinis. The latter was intended to link Monfalcone to the inland waterways of the Venetian plain, but is unfinished.

Quays are about 6 feet in height. Berthing is usually alongside.

<i>Name</i>	<i>Length (feet)</i>	<i>No. of cranes</i>	<i>Facilities, &c.</i>
Bacino di Panzano			
Bacino I	About 1,400	..	Basin is bordered largely by the aircraft building section. Two floating docks are moored alongside each other at the head of the basin.
Head of basin (NW. end) Quay, divided in two by a crane-jetty	160, SW.; 120, NE.	1	Probably faced with concrete blocks, with concrete-surfaced fill behind. SW. part, aircraft; NE. part, stores, &c., for floating docks. Access to the floating docks is obtained from the extreme NE. end of quay.
NE. side of basin . .	..	..	NW. part devoted to small craft. SE. part devoted to aircraft.
NW. Quay	630	1	Very recent construction (1943). Probably concrete blocks. Small naval craft fitting-out or refitting. Two railway tracks along quay.
Central Aircraft Quay set back slightly from NW. Quay. Divided in two by a slipway and a crane-jetty	125, NW.; 125, SE. (total 330)	1	Slipway, lying between NW. part of quay and crane-jetty, is 60 ft. long. Single railway track behind hangars.
SE. Aircraft Quay . . Divided in two by a crane-jetty	110, NW.; 100, SE.	1	Separated from Central Aircraft Quay by a large hangar, built down to water's edge. Single railway track behind hangar.
Bacino II	About 1,200	..	Basin was used as a gravel pit; although deep in middle, approaches are shoal. It is separated from Bacino I by a narrow peninsula, faced by a rough seawall; elsewhere, except for quay described below, the shores of basin are rough and low-lying. An aircraft runway of recent construction almost reaches the NW. corner of the basin.
Quay along NE. part of head	240	..	Not completed. Landing of Trieste - Monfalcone ferry-steamers.
Bacino III			
Quay in NE. corner . .	300	? 1	Narrow pier, 135 ft. long, projects SW. from centre.
Porto Rosega			
SW. side (Cantieri Riuniti dell'Adriatico quays)	..	..	Routes connect with shipyard and Ronchi railway station.
Submarine fitting-out quay (dog-legged)	(SE. leg, 435; NW. leg, 725)	2	Concrete, faced with concrete blocks. Railway tracks along both legs.
Electrical workshop quay	390	1	Fitting-out. Railway tracks.
NE. side . . . .	..	..	Railway connects with Monfalcone railway station and with Adria chemical works.
SE. quay	SE. 350 ft. only is quayed: NW, 370 ft. is sloping	..	Railway tracks along quay.

<i>Name</i>	<i>Length (feet)</i>	<i>No. of cranes</i>	<i>Facilities, &c.</i>
Banchina Solvay . .	320	2	Railway track at back of quay. Coal and salt for Adria chemical works.
Banchina verso Monfalcone	650	..	Coal and general cargo. Railway track at back of quay.
Canale Valentinis SE. end, SW. side 100-ton crane quay	750	4	Fitting-out, including installation of engines and turrets. Railway tracks.
NW. fitting-out quay .	830	1	Fitting-out. Railway tracks.
NW. end, NE. side Monfalcone quay	290 SE. of bridge; 225 NW. bridge	..	Probably faced with concrete blocks, surfaced dirt fill behind. Small passenger and fishing craft; probably main landing for town.

Facilities. There are 4 cranes, 3 of which are cantilever cranes on projecting jetties for aircraft, in the Bacino I. The western quays of the Porto Rosega and the building slips have about a score of cranes in great variety, the largest of which is a 100-ton fixed crane on the south quay of the Canale Valentinis. There are numerous small travelling cranes which can be moved on rail tracks to any quay served by rail. The floating equipment includes 1 sheer-legs of 20 tons and one of 10 tons.

There are no warehouses in the harbour area. Stocks of coal for bunkering are not large, but the shipyard and the chemical works have small supplies for their own use. There is no oil storage. The Banchina Solvay and the shipyard quays are supplied with water. The quay north of the former, named the Banchina verso Monfalcone, the quays on the north-east and south of the building slips, and the building slips themselves are electrically lit.

Repairs of every kind can be executed in the port, and the shipyards, though specializing in recent years in submarines and aircraft, are equipped to build all types of ships. The 28,000-ton liner *Stockholm* was built at Monfalcone. There are two hauling-up ramps for sea-planes on the north-east of the Bacino I, and a slipway, 140 feet long and 50 feet wide, between the two quays at the south end of the Canale Valentinis. The dimensions of the three floating-docks are as follows:

<i>No.</i>	<i>Position</i>	<i>Extreme length (feet)</i>	<i>Width (feet)</i>	<i>Depth (feet)</i>	<i>Lifting capacity (tons)</i>
1	Porto Rosega	541	83	21	13,000
2	Bacino I	229½	67½	21	2,000
3	Bacino I	172	55½	..	1,300

The port is well served by rail and road.

Trade and Connexions. The trade of the port is intimately connected with the activity of the shipyard. Exports are negligible. Of the normal trade of 100,000–130,000 tons per annum, 95 per cent. are imports consisting almost entirely of coal and raw materials for the shipyard, and chemical works.

Inland Communications

Railways. Monfalcone is on the double-track line from Venice to Trieste which is electrified between Cervignano and Trieste. It is the junction for an electrified double-track line to Gorizia and Udine.

Roads. Monfalcone is on road 14 from Venice to Trieste. There is a main road to Gorizia and Udine via Gradisca and a secondary road, which joins road 55 from Trieste to Gorizia and Caporetto.

Airfields. There is an airfield about 2 miles north-west of the town and a seaplane base in Bacino I.

Inland Waterways. Monfalcone is within easy reach of the Litoranea Veneta.

TRIESTE. Latitude $45^{\circ} 39' N$. Longitude $13^{\circ} 45' E$. Population 234,800. Provincial capital. Seat of bishopric. University. Chamber of Commerce and branch of British Chamber of Commerce. British Consul.

Position and Site (Fig. 30; Plates 38 and 39)

Trieste is on the east coast of the gulf of Trieste and about 70 miles east-north-east of Venice. The north-west side of the gulf is formed by the Isonzo delta south of Monfalcone; the eastern side by the steep escarpment of the Carso Tergestino, a limestone plateau 800–1,000 feet high behind Trieste; and the south-east side by the bays of Muggia, Capodistria, and Pirano, which are backed by broken, hilly country of sandstone and clay. Trieste, situated where the shore of the gulf curves south-westwards at the Baia di Muggia, is near the junction of the limestone block with the sandstone and clay wedge which crosses the Istrian peninsula in a south-easterly direction. The city extends between the suburb of Barcola on the north and the Valle di Zaule on the south. The latter is the eastern continuation of the Baia di Muggia, which is backed inland by salt-pans. The main part of the city is on two low, hilly sandstone headlands, and on three small plains formed at the mouths of streams, the northern of which flows into the Porto Doganale north of the headland of S. Giusto, the middle one into the head of the bay along the south side of the head-



FIG. 30. Trieste

land, and the southern divides in two the headland forming the north shore of the Valle di Zaule. The steep limestone scarp, which leaves the coast near Barcola, backs the sandstone and clay ridges and extends about 3 miles east of the main part of the city where it attains heights of 650–800 feet about 2 miles inland (highest point, Montebello, 880 ft.). The average height of the seaward spurs of these sandstone ridges is about 200 feet, the S. Giusto hill (262 ft.) being the highest point of the northern ridge and S. Pantaleone hill (249 ft.) of the southern.

The pre-Roman town was built along the northern headland and up the steep slopes of the S. Giusto hill, which is crowned by the Castello. The original site did not expand greatly from Roman times until the eighteenth century, when the modern development began. The newest parts of the city are along the harbour front, inland up the northernmost of the valleys, and south-eastwards along a tributary which curves behind the S. Giusto hill. Many of the nearby villages are becoming residential suburbs.

The old city is composed of steep, narrow streets, with small houses, but part of the area east of the Piazza dell' Unità, which backs the Bacino S. Giusto (5), has been cleared and rebuilt in the last twenty years. The new town has wide straight streets intersecting at right angles and large modern blocks of buildings. It contains the commercial quarter in the triangle formed by the harbour front, the Via Carducci on the north-east, and the Corso Vittorio Emanuele III at the foot of the S. Giusto hill. Shipbuilding and heavy industry is concentrated to the south of the city between the Porto Duca d'Aosta and the Valle di Zaule. Residential suburbs are spreading up the valleys, especially those north and south of the S. Giusto hill: in the northern valley are the suburbs of Boschetto, and, where it fans out at its upper end, Guardiella; and on the foothills along the valley to the south-east of S. Giusto are the suburbs of Chiadino and Rozzol. In the lesser valleys just to the north of the city are the suburbs of Scorcola, Roiano, and Gretta, whilst expansion inland farther north is prevented by the Carso escarpment. South of the city the suburb of Servola is on the north side of the southern headland.

History

The ancient city of Tergeste was subjugated by the Romans about 177 B.C. Under the empire it became a flourishing sea-port, and its citizens fought in the XVth Legion under a native tribune. In A.D. 848 the Emperor Lothair I conferred temporal jurisdiction upon its

bishop, who later obtained the title of Count of Trieste. From the middle of the twelfth century, however, the power of the bishop declined and by 1295 Trieste had all the attributes of a free commune. Her long rivalry with Venice dated from 1202, when an annual tribute of ships and an oath of allegiance was forced upon her by her more powerful neighbour. Trieste was aided in her struggle for independence by the Patriarch of Aquileia, under whose suzerainty the city lay, but the danger from Venice continued, and in 1382 Trieste made a voluntary submission to Leopold III of Austria. Save for a brief interval after 1508, when Maximilian was forced to yield the city to Venice, and for the period of French occupation under Napoleon, Trieste remained in Austrian hands until 1918. She received many favours from the House of Habsburg. Charles VI made Trieste a free port (1719), Maria Theresa founded a school of mathematics and navigation there (1754), and the city was greatly enlarged. In the nineteenth century the formation of the Austrian Lloyd shipping company and the opening of the Suez canal brought increased prosperity. Trieste, however, remained Italian in speech and culture, and after the formation of the kingdom of Italy, the citizens grew more and more restive under the Austrian yoke. In 1882 the Government's plans for celebrating the fifth centenary of the cession of Trieste to Austria roused irredentist sentiment to a fury, and Guglielmo Oberdan organized an attempt on the Emperor's life, to be made on the occasion of his visit to the city. The plot was discovered and Oberdan was executed; his death earned for him a place among the martyrs for the cause of Italy. The Italian armies entered Trieste on 3 November 1918. According to the Austrian census of 1910 the population of the city proper was overwhelmingly Italian (95,583 Italians, 21,672 Slavs, 9,255 Germans), and despite a considerable Slovene population in the district, Italians represented half the population of city and commune taken together. From the time that Trieste became Italian, the Slav minority was further reduced, whilst the number of Italians was swelled by immigration.

Public Buildings and Monuments

Trieste is a busy modern port having its centre in the Piazza dell' Unità, the site of the great Palazzo Lloyd Triestino (1880-1885) and other public buildings. The cathedral of S. Giusto consists of two ancient churches founded on the site of the Roman temple of Jupiter, Juno, and Minerva, and joined together in 1305. The central portal

embodies the sepulchral stele of the Barbia family, and above it are the arms and bust of Pope Pius II who was Bishop of Trieste (1447-1450), and acted as a mediator between the city and Venice. The massive campanile (1337) incorporates part of the Roman temple. A vaulted Roman archway of the Augustan age is known as the Arco di Riccardo, owing to a doubtful tradition that Richard Cœur de Lion was imprisoned here. The Castello, dating from the fourteenth century and enlarged by the Venetians in 1508, contains a medieval museum. Among other interesting museums are the Orto Lapidario, a collection of antiquities arranged in a garden, the Museo Revoltella, an important collection of modern art, the new Museo del Mare and the Museo del Risorgimento; this last is in the Piazza Oberdan, where there is a monument to the patriot by Selva. The beautiful marble church of S. Spiridione (1860-1886) belongs to the Serbian Orthodox community. Sta. Maria Maggiore, the Jesuit church, is a typical baroque building (1627).

Industry

Trieste is one of the principal ports for the transit of German and central European goods to the Levant and the Far East. It is also the third port in Italy, being the most important passenger port. The city is a major fishing and industrial centre, particularly for shipbuilding. The Ilva steelworks at Servola have an annual crude steel capacity of 50,000 tons, and the accompanying coking-plant an annual capacity of 200,000 tons. The Fabbrica Macchine S. Andrea, a branch of the Cantieri dell' Adriatico, has two works manufacturing boilers, industrial motors, turbines and diesel motors up to 30,000 h.p., heavy castings, iron and steel work for bridges and cranes, tanks, gasometers, and large pipes for aqueducts. The Cantieri Riuniti dell' Adriatico, which has two shipyards in Trieste, can build battleships and the largest merchant vessels. A number of small engineering works supply equipment and parts to the large shipbuilding yards. There are two oil refineries in the port, the larger being the Aquila and the smaller the S.I.A.P. (Appendix I). The food-processing industry is the most important after metallurgy and shipbuilding. There are several canning factories for fish and vegetables, one belonging to S.A. Arrigoni, bakeries, a brewery, and vegetable oil refineries and crushing mills. Other larger industries are generally connected with shipping and fishing. There are, for instance, paint factories, an important jute spinning and weaving mill, rope walks, and saw-mills.

Description of Port

Trieste, once the main port of the Austro-Hungarian Empire, was further developed and aggrandized by the Italians when it passed to them in 1919, so that by 1939 it was their premier passenger port, and ranked second only to Genoa in exports, and third after Genoa and Venice in imports.

The approaches are free from outlying dangers, but the anchorage, which is north-west of the harbour, is somewhat exposed.

The original harbour, known to-day as Porto Doganale, or Porto Vecchio, extends along the north-west shore of the S. Giusto headland in the west of the town. It faces north-west and is partially protected by an irregular mole, the Molo Fratelli Bandiera (S. Teresa). As expansion of the port became necessary, the quays and moles comprising the present Porto Vittorio Emanuele III were built northwards, and similar construction took place southwards round the point of the headland into Muggia bay to form the Porto Emanuele Filiberto Duca d'Aosta. To the east of these last works there are two shipyards; various industrial quays, and, in Zaule bay at the head of Muggia bay, several petroleum depots. On the south shore of Muggia bay there is a small artificial harbour at Muggia, and on either side of it, a shipyard.

The quays of Porto Vittorio Emanuele III are 1 mile long. Five rectangular moles form four basins protected by a detached breakwater parallel to the shore. This breakwater, whose ends are at a slight angle to the central portion, is about 1,200 yards long and lies 500 feet off the heads of the moles, though near its northern end a spur projects 160 feet towards an opposing mole. General depths in the harbour are between 36 and 48 feet. The northernmost basin is almost enclosed by a narrow jetty built from the head of and at right angles to the mole to its north. There are warehouses served by roads and railway lines on every mole and behind all the quays; and the whole area is backed by the extensive marshalling yards of the main station.

Ruling depths in Porto Doganale are from 30 to 42 feet. The quays that line its shore are broken by five moles of various sizes, the largest, in the centre, being the principal passenger terminal with the Stazione Marittima on it. The southern quays and moles are devoted to coastal steamers and fishing vessels, while to the north, separated from the other quays by the mouth of the Canale Grande, is the seaplane station. The whole area is open to the town and served by rail.

The quays of the Porto Duca d'Aosta, one facing north-west and the other two south-west, are separated by two rectangular moles projecting west-south-west. They are screened by the Diga Luigi Rizzo, a detached breakwater in three sections which lies to their south-west across the mouth of Muggia bay. The three sections run from north-north-west to south-south-east and lie in echelon to port. From north to south they are about 350 yards, 350 yards, and 1,750 yards long, the passages between them being 750 feet wide. The northernmost breakwater is about 1,200 feet from the head of the opposing mole, and the southern end of the southernmost breakwater is some 2,400 feet from the south shore of the bay. General depths are between 40 and 60 feet.

East of the Porto Duca d'Aosta an indentation in the northern shore is lined by a shipyard with two graving-docks, a long fitting-out quay in front of some bonded warehouses, and a second shipyard with quay and building slips, separated from the last by a pier. To the south-east is the quay of the Gaslini vegetable oil refinery, and south of the refinery is a large timber yard served by the Molo dei Legnami, projecting south-west at its north-west corner. Southwards again from the timber yard is the Ilva steel works with its two quays. All these facilities are served by the lines southwards from the Campomarzio station at the root of the Molo Fratelli Bandiera.

From the south-east of Muggia bay a smaller bay, the Valle di Zaule, extends eastwards. On its north shore is the Porto del Petrolio, protected on the west by a mole serving the S.I.A.P. refinery and the other depots with it. At the head of the bay a rectangular basin, known as the Canale Navigabile, is under construction, and on the south shore is the pier of the Aquila refinery. A railway line circles the bay from the Ilva works to the Aquila refinery with a branch to the S.I.A.P. Refinery.

The small boat harbour of Muggia on the south shore of Muggia bay is formed by two quayed moles, that on the east straight and that on the west dog-legged. Opposite the root of the eastern mole a small quayed basin is formed by a short jetty projecting north-east from the shore, and from its south-east corner a passage leads to a small boat camber. The entrance between the exterior moles is about 180 feet wide, with depths of 8 to 17 feet in the harbour. Half a mile to the east is a small ship-repairing yard facing east, and about the same distance to the west of the harbour is the larger S. Rocco shipyard with building slips to the west and to the east a small fitting-out basin with

a graving-dock, formed between a pier and the quayed western side of the promontory to the east of the yard.

Quay heights are as follows: 9 feet in most of Porto Vittorio Emanuele III, but $7\frac{1}{2}$ feet on the southernmost quay and the southern mole; $7\frac{1}{4}$ feet in Porto Doganale, except for the seaplane station quay which is $7\frac{1}{2}$ feet high; $10\frac{1}{2}$ feet in Porto Duca d'Aosta; $9\frac{1}{4}$ feet on the Molo dei Legnami; and 7 feet on the S.I.A.P. mole.

Facilities. The customs-house and its sheds are just south of the Stazione Centrale, whilst the office of the Captain of the Port and the Health office are both in Porto Doganale.

Although Porto Doganale has no cranes, Porto Vittorio Emanuele III and Porto Duca d'Aosta are very well supplied. Most are on hand-operated semi-portal travelling gantries, and are hydraulic in the former and electric in the latter; their capacity varies from $\frac{3}{4}$ to 5 tons with the majority of $1\frac{1}{2}$ tons. In the shipyards and the industrial works of Muggia bay a greater variety includes one 120-ton hammer-headed crane, travelling bridge cranes, and transporters. The normal floating equipment comprised 12 cranes and sheerlegs of which the largest were of 150 tons capacity.

The majority of the general warehouses are in Porto Vittorio Emanuele III, where there are at least 38 with a total area of approximately 2,750,000 square feet. In the Porto Duca d'Aosta there are 15 with 1,700,000 square feet of storage space, whilst behind the Banchina del Arsenale there are 21 bonded stores with a total capacity of 256,250 square feet. Among the warehouses of Porto Vittorio Emanuele III there are special buildings for fruit, tobacco, and coffee, and a cold store. Porto Doganale has a wine store and two cold stores, while the Porto Duca d'Aosta has a grain silo of 30,000 tons capacity at the root of Molo VI.

The normal stock of coal is 15,000 tons, held by four companies, whilst oil is stored on the north and south-east of Zaule bay (Appendix II).

All the quays and moles west and north of the Banchina del Arsenale have hydrants and electric lighting.

Apart from the slipway of the seaplane station and the small ship yard, known as the Cantieri Metallurgici della Venezia Giulia, with its three slips on the west of the Molo Fratelli Bandieri, the main repair facilities are in Muggia bay. The Lloyd Triestino S.A. di Navigazione has engine and boiler shops east of Porto Duca d'Aosta; its fitting-out quay, the Banchina del Arsenale, has the biggest crane in the port; and it owns the two graving-docks west of the quay.



PLATE 38. *Trieste: Riva Tre Novembre*



PLATE 39. *Trieste*

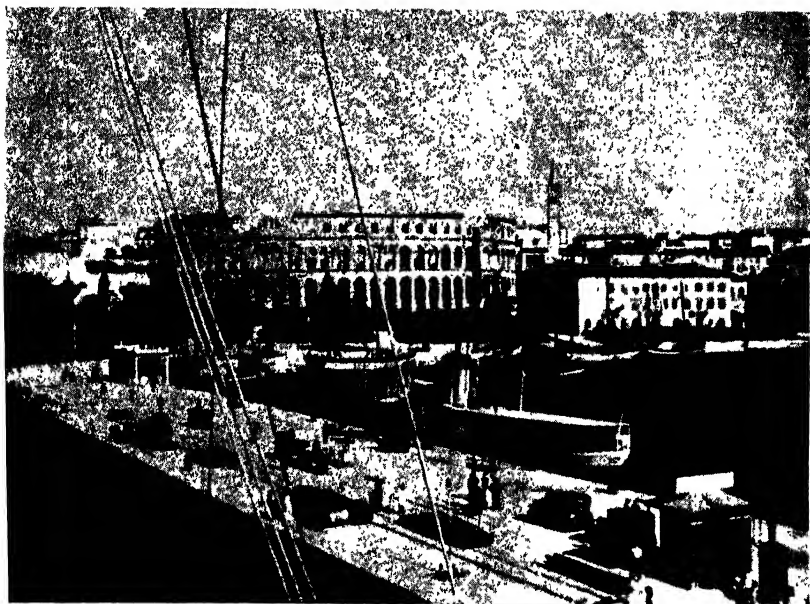


PLATE 40. *Pola: Molo Fiume and amphitheatre*



PLATE 41. *Milazzo: the Marina Garibaldi*

Details of the Lloyd Triestino Graving-docks

	<i>Extreme length ft. in.</i>	<i>Length inside caisson to coping-head ft. in.</i>	<i>Coping width ft. in.</i>	<i>Width at entrance ft. in.</i>	<i>Depth on sill ft. in.</i>
Dock No. 1	456 0	450 0	73 0	71 0	21 2
Dock No. 2	362 0	360 0	67 0	64 0	23 2

The principal firm is, however, the Cantieri Riuniti dell'Adriatico which can undertake any repairs and build any size of ships. On the south shore of Muggia bay the firm owns the small shipyard east of Muggia and the S. Rocco yard west of the village. This latter has two slips, the longer of which is 350 feet, a patent slip 200 feet long with a lift of 450 tons, and a graving-dock 414 feet long, 66 feet wide, and 25½ feet deep at entrance. The firm's main facilities are, however, on the north shore, where it owns the two plants of the Fabbrica Machine S. Andrea, one north-east of the marshalling yard behind the root of Molo VI, which is its main engine and boiler works, and the other north-east of the Banchina dell'Arsenale, which consists of foundries of heavy industrial castings. The S. Marco shipyard, which also belongs to it, lies east of the Banchina dell'Arsenale, and includes four building slips, the longest of which is 670 feet, plate and machine shops, a saw-mill, and a joiner's shop.

The road and rail facilities are ample (Fig. 30).

Trade and Connexions. Before the War of 1939–1945 nearly half of the goods handled by Trieste were in transit for central Europe. The main imports were normally mineral oil, coal and coke, cereals, metallic minerals and scrap, oil seeds and fruit, cotton and jute, coffee, and tanning materials. Exports were chiefly timber, iron, paper, textiles, foodstuffs, and miscellaneous manufactured goods.

Shipping statistics are as follows:

	1938	1939
Ships entered, number	18,391	19,143
Ships entered, tonnage	5,871,000	5,257,000
Ships cleared, number	18,369	19,147
Ships cleared, tonnage	5,814,000	5,265,000
Goods landed, tons	2,371,000	2,149,000
Goods loaded, tons	1,016,000	1,076,000

Trieste is, furthermore, the largest Italian passenger port, with 1,028,930 and 1,003,553 passengers respectively disembarked and

embarked in 1938, and 899,285 and 891,829 in 1939. Many foreign shipping companies include the port in their itineraries, and it is the headquarters of several Italian shipping lines, the most important of which is Lloyd Triestino. The many local services include sailings twice daily (except Sundays) to Gradó, and several daily to the small ports on the west coast of the Istrian peninsula, one of which reaches Pola and, twice a week, continues to Zara. The following sailings from Venice call: twice-weekly to Pola, Zara, and Gravosa; weekly to Pola, Zara, Dalmatija, Albania, and Bari, to the Aegæan islands and Rhodes, and to Bari direct.

Most of the Italian foreign sailings call both inwards and outwards at Venice and Fiume, Bari and/or Brindisi, and in some instances also at Spalato. They are as follows, omitting intermediate ports: weekly, to Sicily, Naples, Genoa, Marseilles, and Valencia, to the Piræus and Istanbul, to Rhodes, Cyprus, Palestine, and Beirut; every 10 days, coastwise to Genoa, to Pola, Catania, Malta, Tripoli, and Benghazi; fortnightly to London, Hamburg, Rotterdam, and Antwerp, coastwise (two services) to southern Italy, Sicily, Sardinia, Savona, and Genoa, to Alexandria, Beirut, and Haifa, to the Piræus, Rhodes, and Alexandria, to the Piræus, Crete, Alexandria, Syria, Alexandretta, Cyprus, and Rhodes, to Cyprus, Alexandria, Syria, Palestine, and Crete, to the Piræus, Salonika, Istanbul, Bulgaria, and the Danube ports, to the Piræus, Smyrna, Istanbul, and Bulgaria, to Port Said, Massawa, and Djibouti, to Sicily, Naples, Algeria, and the Gulf of Mexico, to Sicily, North Africa, and Spain, to Sicily, Naples, and Genoa, with connexion thence to Morocco; monthly to Port Said, the Red Sea ports, Berbera, Colombo, Calcutta, and Madras, to Sicily, Port Said, Aden, East, South, and West African ports, Morocco, Marseilles, Genoa, Leghorn, and Naples, a second service in reverse to the previous, to Naples, Leghorn, Genoa, Marseilles, Gibraltar, Casablanca, West Africa, and the Congo, to Port Said, the Red Sea ports, Aden, Bombay, Karachi, and the Persian gulf, to Port Said, the Red Sea ports, Aden, Karachi, Bombay, Colombo, Penang, Singapore, Batavia, Saigon, Hong Kong, Shanghai, Kobe, and Yokohama, to Port Said, Madras, Calcutta, and Rangoon, to Leghorn, Genoa, New York, and north-east coast ports of the United States, to Sicily, Naples, Leghorn, La Spezia, Santos, Montevideo, and Buenos Aires, to Naples, Leghorn, Genoa, Marseilles, Trinidad, the Panama canal, and the west coast of North America to Vancouver; and 21 times a year, to Port Said, Massawa, Aden, Bombay, Colombo, Singapore, Manila, Hong Kong, and Shanghai.

No.	Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
<i>Porto Vittorio Emanuele III</i>					
	Breakwater (on west)	20	485+ 2,790 +300	—	Inner side quayed, parapet along outer side. Ships laid up or waiting for cargo.
o	Molo O . . . .	..	..	—	Outside of mole and jetty not used for berthing. Coal.
	Inside of jetty . .	22-27	520	—	..
	South side of mole.	27	490	—	..
	Riva I	19-26	751	7	..
1	Molo I . . . .	..	..	—	Fruit.
	North side . . .	19½	550	5	..
	Head	16½-24	340	2	..
	South side . . .	25	730	8	..
	Riva II	26-30	880	8	..
2	Molo II				
	North side . . .	15-18	650	6	..
	Head	25-29	275	2	..
	South side . . .	28-30½	645	6	..
	Riva III	25-28	970	8	..
3	Molo III				
	North side . . .	24	690	7	..
	Head	25	250	1	..
	South side . . .	23	690	8	..
	Riva IV	15-25	980	9	Meat. Customs-house behind warehouses at south-east end.
4	Molo IV . . . .	..	..	—	Pumping station for hydraulic cranes at root.
	North side . . .	23	440	4	..
	Head	18-24	280	1	..
	South side . . .	19	500	5	..
<i>Porto Doganale</i>					
	Bacino S. Georgio .	..	..	—	Two parts separated by
	North-east side .	19	330	1	Canale Grande. Seaplane station on north-east side.
	Riva Tre Novembre	12-14	166 × 4	—	Riva Tre Novembre in 4 lengths slightly dog-legged. Captain of the Port's office behind north-east end.
	Molo Audace . . .	..	..	—	Coastal trade.
	North-east side .	5-15	800	—	..
	Head	17	75	—	..
	South-west side .	14-17	780	—	..
5	Bacino S. Giusto .	..	..	—	Coastal trade.
	Riva del Mandracchio .	14½-20	930	—	Lloyd Triestino building be- hind.
	Molo Bersaglieri .	..	..	—	Passenger traffic. Platform on piers, 39 ft. wide, along north-east side except for outer 110 ft. Two movable gangways at first story level on each side of Stazione Marittima.
	North-east side .	32½	690+110	—	
	Head	23	245	—	
	South-west side .	28-29	790	—	
6	Bacino S. Marco .				
	Riva Nazario Sauro	16	410	—	Coastal trade.

No.	Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
	<i>Porto Doganale (contd.)</i>				
	Molo della Pescheria	..	..	—	Fish.
	North-east side .	19-22	515	—	..
	Head . . .	16	85	—	..
	South-west side .	25	415	—	..
	Riva della Pescheria .	14	367	—	Fish. Fish market and cold store behind.
	Molo Venezia . .	..	..	—	Coastal trade and wine.
	North-east side .	21-25	640	—	..
	Head . . .	15	65	—	..
	South-west side .	15-17	640	—	..
7	Bacino Sacchetta				
	Riva Grumula				
	North-east part .	8	310	—	Wine store behind. Reclama- tion at south-west end.
	Molo Sartorio				
	North-east side .	8-10	330	—	} Pleasure craft. Royal Yacht Club on widened, L-shaped head.
	Head . . .	12	165	—	
	South-west side .	8-10	420	—	
	Riva Grumula, . .	..	265+	—	
	south-west part	7-12	200+	—	..
			200+200		
	Riva Ottaviano Au- gusto	19-24	650	—	Coastal craft.
8	Molo Fratelli Bandiera				
	East side, south part	18-24	420+105	—	Cold store behind.
	East side, north part	10-14	300+	—	Set back 105 ft. from southern part. Protected by jetty in north-east running 160 ft. shorewards. Boat camber.
			180+		
			180+		
			160		
	Breakwater . . .	25-32 (inside)	565+	—	Three legs west, south-west, and south-south-west pro- tecting a boat-repairing yard between its root and a pier 350 ft. long, 315 ft. to the south.
		23-49 (outside)	240+		
			410		
	<i>Porto E. F. Duca d'Aosta</i>				
9	Riva V . . .	11-28	2,520	—	Coal. Northern 1,400 ft. rough faced. Staz. Campo Marzio behind sea baths at north end.
10	Molo V				Coal.
	North side . . .	28½	1,180	—	..
	Head . . .	28½	525	—	..
	South side . . .	28½	1,125	—	..
	Riva VI . . .	28½	260+	12	..
			1,185		
11	Molo VI				
	North side . . .	28½	180+	12	..
			1,180		
	Head . . .	28½	550	2	..
	South side . . .	28½	2,060	14	Grain. Two pneumatic grain elevators.
12	Riva VII . . .	28½	260+	12	Rough shore at east end where Molo VII was planned.
			1,185		

No.	Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
13	Banchina dell' Arsenale	..	1,250	1	Fitting-out. Bonded ware- houses behind. Two graving docks west of west end.
	San Marco Pier . . .	..	..	—	Fitting-out and refitting.
	West side . . .	17-27	600	3	..
	Head . . .	30	60	—	..
	East side . . .	16-29	600	—	..
	San Marco quay . . .	15	330	—	Fitting out. Small pier, 100 × 15 ft. at east end; slips to its south-east.
14	Gaslini Mills quay . .	25+	1,010	—	Oil seeds and vegetable oils. Approaches only 25 ft. deep; alongside depths are greater.
15	Molo dei Legnami . . .	..	..	—	Timber.
	North side . . .	31	1,230	—	..
	Head . . .	25	80	—	..
	South side . . .	21-25	490+75	—	..
	Scalo Legnami . . .	16	100+	—	} Timber.
			300+240	—	
16	Ilva Steel Works . . .	..	..	—	Coal and iron ore.
	North-west quay . . .	24-26	800	6	..
	South-east quay . . .	23	400	4	..
17	Porto del Petrolio . .	..	..	—	Oil. Pipe lines from mole and pier.
	West mole . . .	..	..	—	West side rough faced.
	East side . . .	19-20	475	—	..
	Extension . . .	3	282	—	..
	T-shaped pier . . .	0-18	200	—	Head 85 ft. long with depths of 26 ft. alongside.
					Four small jetties, 50 ft. to 100 ft. long, to eastwards for discharging oil lighters.
18	Aquila Refinery pier .	26-30	1,100	—	Oil. Outer 475 ft. widened, and 'depth alongside' refers to this only.
	Muggia				
	East mole, inside . . .	7-18	660	—	Outside rough faced.
	Harbour pier . . .	..	..	—	South of pier, a small quayed basin c. 140 ft. by 140 ft.
	South side . . .	8	140	—	with passage to inner boat camber in south-east corner.
	Head . . .	10	25	—	
	North side . . .	9½	200	—	
	West mole, inside . .	5-18	250+200	—	Dog-legged. Outside rough faced.
	San Rocco shipyard				
	East quay . . .	21	525	—	Fitting-out.
	Pier . . .	..	..	—	Fitting-out. East side stepped. Dry dock to east of root. Slips to west.
	East side . . .	19	185+140	—	..
	Head . . .	19	50	—	
	West side . . .	19	380	—	

Inland Communications

Railways. There is a double-track line from Trieste (Central Station) to Venice, electrified as far as Cervignano. At Monfalcone, a double-track electrified line branches from the above for Gorizia

and Udine. A double-track electrified line goes to S. Pietro del Carso, where it divides for the route to Vienna via Postumia and for Fiume. From the Stazione Campomarzio there are single-track lines to Pola and to Piedicolle via Gorizia. Electric tramways traverse the city and run to Villa Opicina.

Roads. Trieste is on road 14 from Venice to Fiume. From Trieste road 15 goes to Pola, road 55 to Tarvisio, and road 58 to Postumia. Other main roads lead to Aidussina and Pisino. There are in addition numerous secondary roads serving the immediate neighbourhood.

Airways. From the Bacino S. Giorgio seaplane services operated to Brindisi and Syracuse, and to Pola, Lussino, Brioni, Zara, and Ancona. Planes from Rome and Venice to Bratislava and Prague called at the Ronchi airport.

POLA. Latitude $44^{\circ} 52' N.$ Longitude $13^{\circ} 51' E.$ Population 33,948. Provincial capital. Seat of bishopric.

Position and Site (Fig. 31; Plate 40)

Pola, on the west coast of the peninsula of Istria near its southern end, is at the head of one of several deep indentations. The surrounding country consists of low, partly wooded, limestone hills mostly under 200 feet high, except for M. Daniele (350 ft.), a prominent hill $2\frac{1}{2}$ miles north-east of the town. Owing to the lack of surface streams no dominant valley leads into the bay, which is, for the most part, surrounded by naval establishments and buildings of various kinds. The narrow promontory of Cape Compare south-west of the harbour entrance rises to a height of 226 feet in M. Signale, and is most built-up near its junction with the mainland west of the Porto Militare, from which it is separated by the Penisola S. Pietro, with its conspicuous cement works.

The hills along the northern shore of the harbour also rise to about 200 feet (M. Grosso, 210 ft.), and buildings are mostly confined to their lower slopes near the shore, and inland to near Stignano di Pola. A low promontory, Punta Monumenti, and the off-lying Isolotto S. Catarina are built over, and the extreme north-east corner of the harbour is used for naval stores. The low island of Isolotto S. Andrea (75 ft.) is largely tree-covered and the site of a fort, whilst the island of Scoglio Olivi is occupied by shipyards.

The main town of Pola is built along the eastern shore of the harbour, mostly on low ground and on a few isolated hills. It is separated from the Penisola S. Pietro by the Naval Arsenal, south of

which suburbs spread for about a mile, whilst between the town and the north-east corner of the harbour railway yards and the main station line the shore. The town is bordered on the north by M. Ghiro (151 ft.) and on the south by the ridge followed by the Via dell' Ammiragliato, which attains a height of 184 feet. Between these two the Castello stands on an isolated hill (171 ft.), and a short distance to its south M. Zaro rises to 98 feet. Otherwise the town is built on undulating low ground mostly below 80 feet. The Castello is the nucleus of the old town, round which the streets are arranged radially and in concentric circles. The newer town, to the east and south of the old, is arranged on a regular gridiron system. The cathedral, customs-house, government offices, law courts, police headquarters, and a prominent tobacco factory are along the quayside of the Porto Commerciale at the northern foot of the Castello hill. Other municipal buildings are along the southern foot of the hill.

History

Pola, according to legend, was founded by the Argonauts. It became a Roman naval centre in the second century B.C. under the name of Pollentia Herculaneum. It is said to have been destroyed by Caesar owing to its fidelity to Pompey, and to have been rebuilt by Augustus at the request of his daughter Julia, and called after her Pietas Julia. Owing to its strategic position, important alike in war and commerce, it attained to great prosperity. In the age of the Antonine emperors it was a flourishing city, well fortified and possessed of many fine buildings. Later it suffered much from the barbarian invasions. Venice occupied the city in 1148 and held it until 1797. Austria obtained possession of it in 1815 and made it a great naval port and arsenal. During the War of 1914-1918 it was the chief German and Austrian submarine base in the Mediterranean. Italians, however, continued to regard it as 'Italia irredenta' and claimed Dante's authority for so doing, as he had written in the *Inferno* of 'Pola, near the Quarnero gulf, which encloses Italy and bathes its confines'. Istria was among the territories promised to Italy by the Treaty of London (1915), and the Treaty of Rapallo (1920) confirmed her in possession of Pola, together with the rest of the peninsula.

Public Buildings and Monuments

Pola has important and interesting Roman monuments, which include a splendid amphitheatre, three arches, and the small but

elegant Temple of Augustus and Rome. The Arena, or amphitheatre, is built of white Istria stone, against the side of a hill, presenting three stories to the sea, and two to the land. It was probably begun under Augustus and enlarged under Vespasian, and is in an excellent state of preservation. The arch known as the Porta Erculea dates from the last years of the Republic and is the most ancient building in Pola. The Porta Gemina is a double arch with a rich cornice, and the beautiful Porta Aurea, or Arch of Sergius, dating from about 27 B.C., appears in drawings by Michelangelo and Piranesi. The Reale Museo d'Istria (formerly Museo Civico) has an interesting collection of antiquities. The cathedral, founded on the site of a temple of Jove, was originally a basilica of a type resembling that of the great basilica of Parenzo, but has largely lost its character through successive restorations. Since a fire, which occurred in 1923, some successful attempts at reconstruction have been made. The Palazzo Comunale, originally a Gothic building, was destroyed by the Genoese during the War of Chioggia, and rebuilt in the baroque style. The Arsenal, founded in 1856, is now a naval academy.

Industry

Pola is essentially a naval base and an agricultural, fishing, and administrative centre, and has only two large industrial establishments, the shipyard on Scoglio Olivi, which is mainly engaged in ship-breaking, and the cement works of the Societa Istriana Cementi (total annual capacity of 100,000 tons of cement, including 15,000 tons of bauxite cement). Other industrial plants include the arsenal, small foundries, a tar distillery, rope works, boot and shoe factories, flour mills, and a tobacco factory. There are a number of quarries around the bay of Pola.

Description of Port

Pola has a fine natural harbour, crescent-shaped and almost land-locked, which, both by the Austrians before 1919 and by the Italians since, has been developed primarily as a naval station.

The entrance to the harbour is between Punta Cristo on the north and the north end of the dilapidated breakwater built north-west for nearly 1,300 yards from Cape Compare on the south. The entrance faces north-west and is 1,650 feet wide with depths of 108 feet in the fairway. Approach from the south-west is unobstructed, but that from the north-west is prevented by the Brioni islands. Safe anchorage outside the harbour may be found between these islands and the

mainland in the Canale di Fasana, and inside the sheltered harbour west of S. Andrea island or south of the island of Scoglio Olivi.

These two islands and S. Caterina island to the north-west of the former divide the harbour naturally into three: an outer harbour, the Avamporto, from the entrance to a line joining Punta Monumenti—S. Caterina island—S. Andrea island—Penisola S. Pietro; and a double inner harbour on either side of Scoglio Olivi and the swing bridge joining it to the mainland. The area south of Scoglio Olivi is the naval harbour and reserved exclusively for the Italian navy: that north and east of the island is the commercial harbour, although the naval armament depot lies along the extreme north shore of the bay.

The Avamporto extends for nearly 4,000 yards from north-west to south-east and averages 1,000 yards in width. General depths are from 90 to 108 feet. On its north shore there are two bays, Valle Maggiore, whose jetty and quay are all that was completed of projected harbour works, and Valle Zonchi, whose jetties serve Pola's oil depot at the head of the bay. On the south shore there are four coves, the Valli Figo, Fisella Piccolo, S. Zeno, and Vergarola, each with various quays and jetties serving quarries and naval depots. Numerous other short jetties have been built at several points on both shores of the outer harbour, and at the eastern end of the south shore there are boat-yards with slips for small craft.

The naval part of the inner harbour, Porto Militare, is quayed for the whole of its length between the Penisola S. Pietro and the swing bridge leading to Scoglio Olivi. The central quays are fitted out as submarine berths and at their south-west end is a broad mole to the west of which are the coal wharves. The peninsula of Penisola S. Pietro is quayed and occupied by a large cement works. Ruling depths are between 36 and 78 feet, and less than 27 feet in the boat harbour and coal basin. The Porto Militare suffered considerable damage from bombing in 1944.

The island of Scoglio Olivi is a private dockyard with 2 graving docks and a refitting basin on the north, a floating dock (sunk by bombing in 1944) and a building slip on the south-west, and extensive workshops. Before the War of 1940–1945 this subsidiary of the Cantieri Riuniti dell' Adriatici was concerned mainly with ship-breaking: since 1939 it has been occupied with the repair and maintenance of submarines.

The commercial harbour, Porto Commerciale or Mercantile, lies to the east of Scoglio Olivi. Its quays, broken by the Moli S. Tomaso and Fiume, extend from the root of the Scoglio Olivi bridge east-

north-east and then north-north-east and north to the south end of the marshalling yards which occupy the east shore of the bay. General depths are from 18 to 51 feet, except close east of the island where a shoal, known as the Secca Olivi, has depths of only 2 feet. Along the north shore there are numerous jetties serving the boat-repair yard in Valle S. Pietro, the naval armament depot in Valledunga, the quarry and cement block plant at Punta Aguzzo, and the naval establishments on the north shore of Valle Spini and on Punta Monumenti. On the south of Valle Spini, S. Caterina island, now joined to Punta Monumenti by a 625-feet long causeway, has been developed as a seaplane station, and is largely quayed on its northern half. Its present use, however, is doubtful, since a new seaplane base has been constructed outside the harbour in Ronzi bay north of Valle Maggiore.

A relatively shallow reef connects the islands of S. Caterina and S. Andrea. Across this reef a channel 40 yards wide has been dredged to a depth of 23 feet and marked by 4 light beacons. The bridge joining Scoglio Olivi to the mainland blocks the direct access between the Porto Militare and the Porto Commerciale, but vessels with less head-room than 4 feet can pass beneath its girders, and craft less than 35 feet wide can navigate the passage bridged by the swing-span near the shore end.

Facilities. The naval offices are at the south end of the Banchina Re d'Italia, the east quay of the Porto Militare. All the other offices are in the Porto Commerciale on the Riva Vittorio Emanuele III, the Health office in the covered landing place near its north-eastern end and the Port offices just behind, and the customs-house south of the root of the Molo S. Tomaso.

The port is inadequately supplied with cranes, having only 6 cranes in all. The north quay of the S. Pietro peninsula has a travelling transporter of $1\frac{1}{2}$ tons capacity. Opposite, on Punta Aguzzo, there is a travelling crane on a fixed bridge, whose two ends are, one on the head of the central pier and the other on a dolphin 30 feet off. On Scoglio Olivi there are three travelling cranes, one on the west quay and two on the graving docks. In the Porto Commerciale the only crane is a fixed revolving crane of 15 tons capacity on a pedestal near the north end of the Riva Arena. Of the peace-time floating equipment the most interesting item was a double cantilever crane of special design, whose two grabs, each with a lift of 120 tons, were capable of the salvage of submarines to a depth of 164 feet.

The only warehouses are those of the customs-house and of the tobacco factory near the root of the Molo S. Tomaso. In addition to

the naval coal supplies, a stock of 3,000 tons was normally maintained. The main dump was on the coal quays in the south of the Porto Militare where ships were bunkered, but subsidiary supplies are held by the cement works on the Penisola S. Pietro, and by the State railways in the marshalling yards on the east of the bay. Supplies for the latter are discharged on the Molo Fiume. The only oil supplies are naval (Appendix II). Supplies of water are plentiful and there are hydrants on the Molo Fiume, the Riva Vittorio Emanuele III, and the Molo S. Tomaso, and on the S. Pietro peninsula. It would appear that the quays and moles of the Porto Commerciale are lit by electricity.

The Scoglio Olivi is the main shipyard of the port, and, with its two graving docks, floating dock, and varied workshops, is capable of most repairs and of refitting ships of any size up to a destroyer. Its building slip appears to be no longer in commission.

Details of Graving Docks and Floating Dock

	<i>Length at M.H.W.S. level ft. in.</i>		<i>Length of keel blocks ft. in.</i>		<i>Width of entrance ft. in.</i>		<i>Depth over sill ft. in.</i>		<i>Lifting capacity tons</i>
No. 1 (south)	457	5	397	0	78	9	26	11	—
No. 2 (north)	398	7	326	0	86	11	30	0	—
Floating	329	11	—		35	7	23	5	1,000

Such facilities as existed in the Arsenale Reale Marina have been largely destroyed. There are yards with slips and hauling-up hards capable of building and repairing small craft in Valle Vergarola and Valle S. Pietro.

The station, which is a terminus, is at the east end of the bay north of the Porto Commerciale. From the south end of its marshalling yards a line runs along the quays of the Porto Commerciale and the Banchina Re d'Italia, and thence through the Arsenale Reale Marina to the Penisola S. Pietro, with spurs on to the Molo Fiume, on to Scoglio Olivi, and to the root of the Molo Mirabello. From the north end of the yards a branch runs round the north shore of Valle S. Pietro and Vallengunga to serve the armament depot.

The quays of the Porto Commerciale are backed by an open waterfront, whence there is free access to the main roads of the town. The Porto Militare is confined, for the dockyard is entirely enclosed by a wall and buildings, and the Banchina Re d'Italia is separated from the harbour road by a wire fence with exits only at each end.

<i>Name</i>	<i>Depth alongside (feet)</i>	<i>Length (feet)</i>	<i>Facilities, &c.</i>
<i>Avamporio</i>			
Valle Maggiore quay . . .	0-24	590+500	Eastern 500 ft. unbacked. Spur southwards for 45 ft. at east end.
Valle Zonchi			
L-jetty	0-13	90+125	Pipe-lines to oil tanks.
South jetty	0-30	320	Probably pipe-lines.
Valle S. Zeno			
Main mole	5-20	260	Oriented SSE and slightly curved at root.
Quay	0-10	280	Runs south-west from root of mole to western end of bay. 100 ft. near north-east end set back 15 ft.
Valle Vergarola			
Mole	10-27	500	..
Quay	c. 9	400	Runs south from root of mole. Slip-way askew at south end.
Scoglio S. Pietro, west side	c. 6-26	965	In four irregular lengths.
<i>Porto Militare (W.-E.)</i>			
Scoglio S. Pietro, north, east, and south-east sides	c. 10-24	946	In four irregular lengths. 1 1½-ton travelling transporter with slewing travelling crane on north quay.
Coal harbour:			
West quay	10	190	..
Basin:			
West quay	4-10	293	..
South quay, west	c. 4-10	200	..
Jetty	c. 10-13	230	..
South quay, east	c. 10	160	..
East quay	c. 10-18	157	..
East quay	26-30	390	Large coal dump behind with Decauville tracks.
Mole:			
West side	30	390	..
East side	24-30	550	..
Submarine berths:			
West part	c. 22	495	Set in 25 ft. from east part.
East part	c. 15-22	670	Broken by water gap 250 ft. from north-east end.
East quay:			
South-west part	23-31	600	..
East part	c. 20	140	..
Molo Mirabello:			
Mole	15-23	316	Joined to shore by causeway 72 ft. long and 9 ft. wide.
East jetty	23-26	250	East of Molo Mirabello 11 lengths of quay and two short moles give a total length of c. 2,460 ft. of quay.
Boat harbour	c. 3-24	..	Two parts slightly askew.
Banchina Re d'Italia . . . . .	..	..	Naval officer midway along south part.
South part	13-18	335+365	Curves at north end into eastern pier of bridge to Scoglio Olivi.
North part	13-16	620	
<i>Scoglio Olivi</i>			
South side	c. 10	..	Irregular quays and jetties, the longest 246 ft. immediately south of bridge, give a total of 1,258 ft. of quay in 13 lengths.

<i>Name</i>	<i>Depth alongside (feet)</i>	<i>Length (feet)</i>	<i>Facilities, &c.</i>
South-west mole:			
East side . . .	20-40	280	..
West side . . .	c. 20-40	525	Floating dock moored off north end.
West side:			
South part . . .	c. 20	400	..
North part . . .	c. 20	190+55	Two graving docks immediately to north-east.
North side:			
Outside of graving dock	c. 26	425	Spur jetty (25 ft. long) at east end.
V-basin:			
West side . . .	c. 0-20	270+105	Slightly dog-legged.
East side . . .	c. 0-20	120+183	Northern 120 ft. set forward 6 ft.
Refitting basin:			
West side . . .	c. 13-20	310+225	Northern 310 ft. set back c. 25 ft. Inward spur 39 ft. long at north end.
Head . . .	c. 13	176	Central 76 ft. set back and sloping.
East side . . .	c. 13	568	Extended 380 ft. by 4 dolphins.
East side . . .	c. 6-23	340+745	Northern 340 ft. set back 18 ft.
<i>Porto Commerciale (W.-E.)</i>			
Riva V. Emanuele III			
West part . . .	12-23	1,100	At west end 195 ft. of quay at an angle forming north-east side of east pier of bridge to Scoglio Olivi.
Molo S. Tomaso . .	9-26	210	Coastal steamers. 60 ft. wide.
East part . . .	9-13	650	Covered landing place and Health offices project 22 ft. at east end. Post Office behind.
Riva Arena . . .	c. 12	440	One fixed crane near north end.
Molo Fiume . . .	..	..	Passenger terminal. Coal for railway.
South side . . .	12-21	495	..
North side . . .	5-26	440	..
Riva Venezia . . .	c. 5	35+260	Dog-legged. Mandracchio pier (50 ft. long) at north end.

Trade and Connexions. Almost all the trade of the port is in supplies for the navy, the dockyards, and the cement works. The principal imports are normally coal and oil, limestone, and foodstuffs, while the chief exports are bauxite, cement, silica, scrap iron, and local agricultural produce.

Statistics of shipping and passenger traffic are as follows:

	1938	1939
Ships entered, number	4,381	3,712
Ships entered, tonnage	1,073,000	894,000
Ships cleared, number	4,389	3,752
Ships cleared, tonnage	1,072,000	896,000
Goods landed, tons	269,000	264,000
Goods loaded, tons	185,000	189,000
Passengers disembarked	39,713	32,984
Passengers embarked	40,441	35,090

Pola is a port of call on several of the North Adriatic services from Venice or Trieste to Istrian ports, Zara, and Gravosa, on the weekly Venice-service via Trieste, Dalmatia, and Albania to Bari, on the fortnightly Genoa-Venice coastwise service, and on many of the Fiume sailings (p. 435), one of which has Pola as its terminus. In addition the town has its own sailings twice daily to Brioni, and weekly to Cherso.

Inland Communications

Railway. Pola is the terminus of a single-track line from Trieste. Electric trams traverse the city.

Roads. Road 15 goes to Trieste and at Dignano road 61 branches off to Fiume and another main road to Rovigno. There is a secondary road to the Canale dell' Arsa as well as a network of local roads.

Airways. Seaplane services from Trieste to Zara and from Venice to Fiume called at the seaplane base in the Canale Fasana.

FIUME. Latitude $45^{\circ} 20' N$. Longitude $14^{\circ} 26' E$. Population 52,893. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site (Fig. 32)

The coast at the head of the Gulf of Fiume runs east-south-east from its inner angle near Abbazia to the frontier of Yugoslavia. This stretch of coast is hilly, rising steeply inland to heights of over 1,000 feet a little over a mile from the shore, and is unbroken by river valleys except in Fiume itself. Here the Valscurigna and the gorge of the F. Rečina (Eneo) reach the sea.

The city of Fiume extends along the coast for nearly 3 miles west of the mouth of the gorge, and the Yugoslav town of Sušak occupies a further mile of the shore to its east. The industrial part of the city is concentrated in a narrow band along the coast road west of the flatter ground near the mouth of the gorge, where the old city occupies a wider area. Many important buildings, including the Town Hall, Law Courts, cathedral, and others are in the old city. The modern business quarter is between the old city and the railway station, which is on the wider area of lowland at the mouth of the Valscurigna, whilst the power station and water works are in the Rečina gorge. The streets in the old city are narrower and more winding than those in the business quarter. Small suburbs and villages spread up the hill-slopes above the coastal belt, and especially up the small Valscurigna.

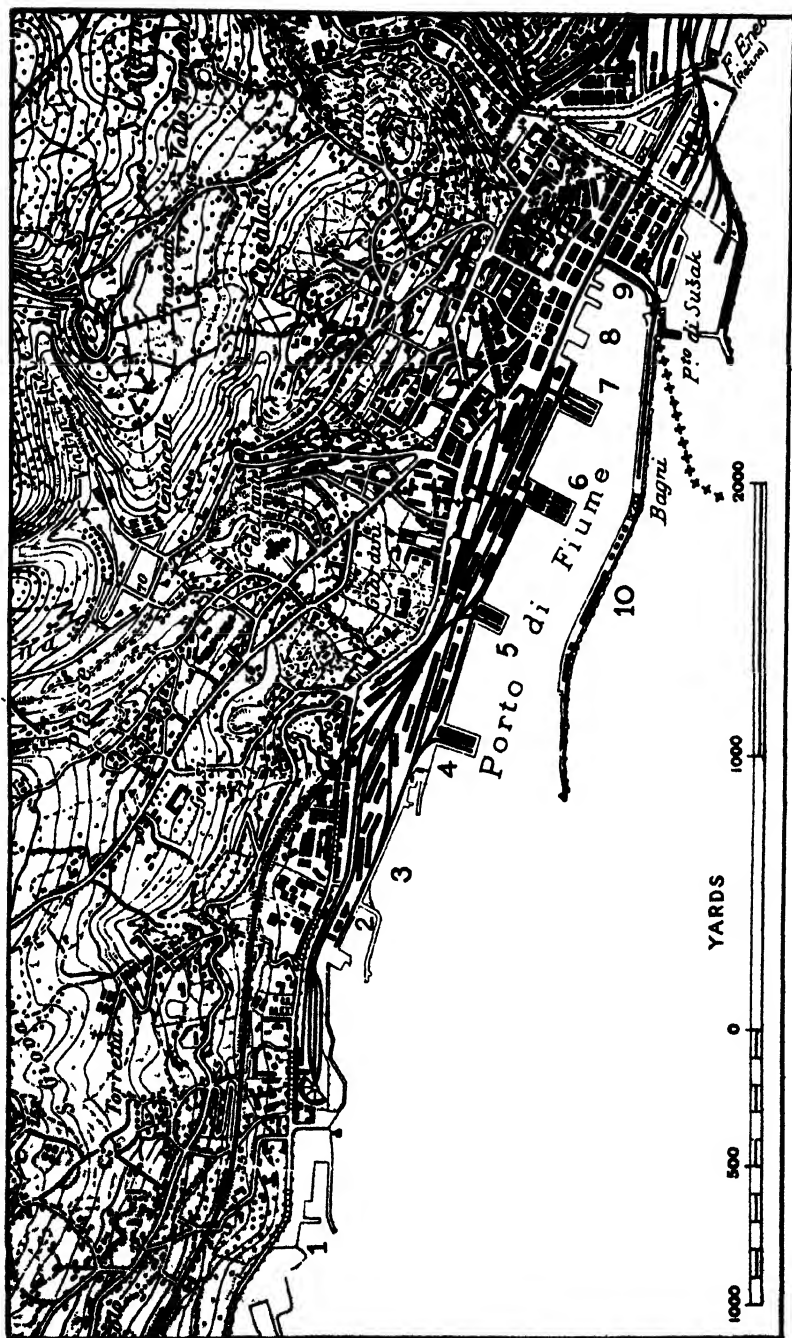


FIG. 32. Fiume

The frontier approaches to within a $\frac{1}{4}$ -mile of the shore near the extreme western end of the coastal commercial area of Fiume, but swings north-east leaving the city in an Italian 'pocket', only to regain the coast by the Rečina gorge. At the mouth of the Rečina, part of the docks are artificially divided between Italy and Yugoslavia by a high frontier fence.

History

Fiume is of Roman origin but the name is a corruption of Terra Fluminis S. Viti, which first occurs in the thirteenth century. It was subject to various feudal lords until in 1471 it passed to the Hapsburgs; but the feudal tie was loose and in practice it was all but a free commune. Venice had long coveted Fiume and in 1508 she occupied it. It changed hands more than once during the War of the League of Cambrai, and suffered much damage before it finally returned to the Hapsburgs. During the seventeenth and eighteenth centuries it increasingly prospered and the Emperor Charles VI made it a free port, of which the rights were respected even after its annexation to Hungary in 1779. When under French occupation (1809-1813) it was bombarded by the English fleet. On the Hungarian revolution of 1848 it was occupied by Croatian forces, and not restored to Hungary until 1867. As the sole port of Hungary it became of great importance, and enjoyed many rights, including the free use of the Italian language. Nevertheless the Italian leanings of its citizens grew stronger, and in October 1918 they voted for union with Italy. Fiume, however, had not been promised to Italy by the Treaty of London (1915) and the Italian Government, after pressing its claim to it at the Versailles Conference, declared that under present circumstances it did not desire to annex it. In September 1919 it was seized by Gabriele d'Annunzio and his band of *Arditi* in the hope of forcing a decision favourable to Italian ambitions. By the Peace of Rapallo (1920), however, it became a small independent state, and d'Annunzio was ejected. The mixed population of Italians and Slavs, and their mutual enmities proving incompatible with peaceful administration, in 1924, by the Treaty of Rome, Fiume passed in full sovereignty to Italy, while the suburb of Sušak with Porto Baross was assigned to Yugoslavia.

Public Buildings and Monuments

Fiume has few buildings of interest. The cathedral was probably Romanesque in origin, but except for the fourteenth-century campanile it has been entirely remodelled. A massive gateway, the Torre

di Città, gives access to the old city, where some relics of Venetian architecture are to be seen. In the Piazza Erbe, in the centre of the old city, is the sixteenth-century Palazzo di Città and a Roman arch, possibly the gate of the Roman citadel. The church of S. Vito (1638–1742) was built in imitation of the Church of Sta. Maria della Salute at Venice; embedded in the façade is a cannon ball which lodged there when Fiume was bombarded by the English fleet in 1813. The Palazzo del Governo is a sumptuous building in the Renaissance style, dating from the end of the nineteenth century. From its balcony the annexation of Fiume to Italy was proclaimed in the presence of King Victor Emanuel III on 16 March 1924.

Industry

The principal industrial activities in Fiume are concerned with the manufacture of torpedoes and shipbuilding. The Silurificio Whitehead's establishment, which employs 2,000 persons in peace-time, is Italy's most important torpedo factory and assembly shop, and probably accounted for 50 per cent. of Italian production. The Cantieri Navale del Quarnero is equipped for building tankers, cargo vessels, submarines, and battleships up to 20,000 tons. Besides these establishments there are four foundries and over 30 machine or metal working shops. The principal chemical works in the city makes superphosphates, bone-meal, concentrated sulphuric acid, pyrethrum powder and extracts. The R.O.M.S.A. mineral oil refinery is one of the most important in Italy and its equipment includes a modernized topping plant, a liquid phase cracking-plant, a vacuum distilling plant for lubricants and a solvent plant also for lubricants (Appendix II). Other industrial plants include a large rice mill, a chocolate factory, a food preserving factory, dairies, distilleries, flour mills, tobacco and soap, furniture, paint and varnish factories, saw-mills, paper-mills, rope walks, and clothing mills.

Description of Port

The original port of Fiume was built at the more westerly of the two mouths of the F. Rečina, now the Canale della Fiumara (Morto) and cut off from the parent stream. Since 1872 eight basins have been constructed westwards from this point, each protected by a mole built roughly west parallel to the shore and joined to it at the eastern end. The main facilities of the port are in the largest of these basins, the Porto Principale or Porto di Fiume, which is protected by the Molo Ammiraglio Cagni. The basin which lays outside the root of this

mole, the Porto Baross, was ceded to Yugoslavia in 1924 together with the Canale della Fiumara and the triangular timber yard between the two river mouths. The Porto Baross is now known as the Luka Sušak, or the Porto di Luka, and the whole area east of the frontier as the port of Sušak.

The only direct approach is by the Great Quarnero channel between the island of Cherso and the east coast of the Istrian peninsula. The channel is $2\frac{1}{4}$ miles wide at its narrowest, and the near approaches are unobstructed. There is exposed anchorage anywhere before the port within about 1 mile of the shore, but ships cannot anchor even in the Porto Principale without obstructing the approaches to the quays.

The westernmost of the eight basins lies nearly $3\frac{1}{2}$ miles west of the Canale della Fiumara. It is a small boat harbour below and south-west of the Campo Sportivo, protected by an L-shaped breakwater on east and south. Half a mile to the east is another small boat harbour, the Porticciolo Cantrida, immediately west of the Porto Bergudi, a shipyard with building slips, a floating dock, and a fitting-out basin protected by an irregular mole on the south-east. The fourth basin is the Porticciolo del Silurificio (1), the L-shaped harbour of the torpedo factory. Eastwards again is the rectangular Porto del Petrolio (2), with the R.O.M.S.A. refinery to its north. Immediately to its east the Riva Costanzo Ciano (dei Legnami (3)) is an exposed quay built in 1930 to serve the new timber-yard which had been developed when the original timber-yard had been ceded to Yugoslavia. At its eastern end is the sixth basin, an irregular boat camber known as the Mandracchio, with two large molasses tanks on the rough sea front to its east.

The Porto Principale is formed by the Molo Ammiraglio Cagni (10), which is built in four unequal legs. The entrance, between the head of the mole and the opposing Molo Palermo (4), fades west, and is about 800 feet wide with depths of 100 feet or more. The harbour, with general depths of 36 to 126 feet, is divided into four basins by the three broad moles, the Moli Napoli (5), Genova (6), and Ancona (7), which, like the Molo Palermo, project south-south-west from the shoreline. On the north side of the innermost of these basins there are three smaller moles and a rectangular projection at each corner. The whole shoreline, the moles, the head of the basin, and the inside of the outer mole are quayed, and give a total length of about $2\frac{3}{4}$ miles of quays.

At the root of the Molo Ammiraglio Cagni a channel 58 feet wide,

28 feet deep, and spanned by a swing-bridge, gives access to the Luka Sušak which is roughly rectangular. The main entrance, 180 feet wide and facing west, is between a spur projecting north from the junction of the two legs of the southern mole and an opposing spur at right angles to the Molo Ammiraglio Cagni. There are depths of 70 feet in the entrance and general depths of 48 to 84 feet in the harbour. The Lazarus ship-yard occupies the north-west corner of the basin, the Canale della Fiumara is entered from the north-east corner, and a short mole (Gat E. Bačića) projects westwards in the south-east corner. There are quays along the north (Pristanište Karadjordjevo), east (Obala Frana Supila), and south (Gat Aleksandra I) sides of the harbour as well as along the Gat E. Bačića and the Canale della Fiumara. The latter is 1,800 feet long and about 100 feet in width, although the entrance is only 50 feet wide between the buttresses of the southern of the two swing-bridges which carry road and rail across it. Depths are reported to be dredged to 16½ feet.

The eastern mouth of the Rečina is suitable only for small craft and its stone-faced banks are sloping. Immediately east of the mouth is a small boat camber protected by two jetties on either side of its entrance. That on the west is of stone and extends along the east bank of the river; that on the east is a wooden structure. Both project roughly south-south-west and they are 120 feet apart. An unprotected quay, the Pristanište Brajdica, has recently been constructed to their east and at the present time represents the easternmost extension of the port.

Discharging and loading are normally alongside, and the heights of quays are as follows: about 7 feet in the smaller basins west of the Porto Principale and about 6 feet on the Riva Costanzo Ciano; in the Porto Principale, 7 feet on the Molo Ammiraglio Cagni, about 5 feet in the innermost basin, and from 7 to 9 feet elsewhere; 5 to 6 feet in the Luka Sušak and the Canale della Fiumara; 6 or 7 feet on the F. Rečina jetties; and 10 feet on the Pristanište Brajdica.

The area west of the Porto Principale, and particularly the refinery, the railway coal depot, and the torpedo factory, have been extensively damaged by the Royal Air Force and saboteurs.

Facilities. The Fiume Port offices are on the Riva Capitaneria in the Porto Principale; the customs-house is near the root of the Molo Genova; and the quarantine station is on the Molo Ammiraglio Cagni opposite the Molo Napoli. The Port offices of Sušak are on the north quay of the Luka Sušak, the Pristanište Karadjordjevo.

The 28 cranes of the Porto Principale and the 11 on the south side

of the Luka Sušak are all electric, travelling, portal or semi-portal cranes of $1\frac{1}{2}$ tons capacity. Of those in the Porto Principale, 4 are with the 4 grain elevators on the Riva Duca degli Abruzzi, and the rest are in the north-west of the harbour, which is as well equipped as any comparable area in any Italian port. The Cantieri Navali del Carnaro have in their shipyard of Porto Bergudi 2 cranes on the floating dock, 2 travelling cranes of $1\frac{1}{2}$ tons capacity, 3 tower cranes, and 1 travelling goliath of about 30 tons capacity which spans the south-eastern of the two building slips. The port has two floating sheerlegs, one of about 15 tons and the other of 25 to 30 tons capacity.

Fiume is very adequately served with warehouses. There are 23 on or near the quays of the three outer basins on the north of the Porto Principale, and three more behind the marshalling yards east of the railway station. All are modern, storied buildings and are well equipped. They include a grain silo which is on the Riva Duca degli Abruzzi and has a capacity of 6,000 tons of grain, and together they give a total of about 1,926,000 square feet of space. In Sušak the building that houses the Port offices is also a warehouse, and so is the single-story building immediately to its east: between them they probably have 90,000 square feet of storage space. Many of the buildings along the east of the Canale della Fiumara are probably warehouses, or could be used as such in emergency.

Although neither Fiume or Sušak is normally a bunkering port, a stock of some 5,000 or 6,000 tons of coal was, in normal times maintained on the second leg of the Molo Ammiraglio Cagni. The only oil depot is in the refinery north of the Porto del Petrolio, to which it is connected by pipe-line (Appendix II). Supplies of water are abundant, and there are hydrants on most of the quays of the Porto Principale and of the Luka Sušak. Boiler-water was obtainable from the north-west quay of the Porto Bergudi and from two water-lighters. There is electric lighting all round the Porto Principale and on the north and east of the Luka Sušak. In the former the four main moles have power-points.

Apart from the small boat-yard west of the Campo Sportivo and such repairs as might be undertaken by the torpedo factory with its two covered slips, the main facilities are in the Porto Bergudi and in the Lazarus ship-yard. The former has four building-slips the approximate dimensions of which are 680 by 75 feet, 660 by 75 feet, 490 by 60 feet, and 350 by 60 feet, a foundry, and boiler, plate and fitting shops. The yard is capable of building vessels up to 20,000 tons, and of executing any type of repair to hull or machinery. At the

entrance to its large fitting-out basin a floating dock with the following principal dimensions is moored:

Extreme length:	309½ feet.	Breadth:	65½ feet.
Depth over blocks:	22 feet.	Lifting power:	4,550 tons.

Few details are known of the Lazarus yard, but its shops can almost certainly undertake most repairs to machinery and hulls, and it probably now operates the floating dock moored to its north in the Porto Principale, whose dimensions are as follows:

Extreme length:	223 feet.	Breadth:	49 feet.
Depth over blocks:	14 feet.	Lifting power:	1,700 tons.

The harbour area of Fiume is enclosed by a wall or fence from the Porticciolo Cantrida in the west to the Molo Ancona on the east. The quays of the innermost basin of the Porto Principale are open to the town, but the exit from the Molo Ammiraglio Cagni is restricted by the swing-bridge at its root. All the shore quays are well served by roads and, with the possible exception of the Riva Costanzo Ciano, have ready access (through gates where backed by the harbour wall) to the main coastal road.

There are extensive marshalling yards backing the port area from the Porto del Petrolio to the Riva Duca degli Abruzzi. From them a line runs west to the shipyard, and spurs, which are flush, serve all the warehouses and quays, with the following exceptions: the nearest line to the Riva Costanzo Ciano is 70 yards back; the tracks on the Riva Thaon de Revel are more than 30 feet from the quay; and there are lines down the centre only of the Molo Genova. These last and the lines on the Molo Ancona are connected to the main system by turn-tables.

The line from the root of the Molo Ancona along the Riva Emanuele Filiberto and Nazario Sauro affords direct communication between Fiume and Sušak. After sending a branch south behind the Riva C. Colombo and out on to the first leg of the Molo Ammiraglio Cagni, it crosses the Canale della Fiumara by the northern swing-bridge and the Rijeka Rečina by the most northerly of the three road-and-rail bridges near its mouth.

The fence which marked the pre-1941 frontier between Italy and Yugoslavia and passes north of the Lazarus shipyard, behind the buildings on the Pristanište Karadjordjevo and inland on the east side of the road skirting the west bank of the Canale della Fiumara to its head, effectively blocks all movement westwards from the Luka Sušak

and canal area. Although there are two gates, one at the west end of the Port offices and one at the west end of the northern swing-bridge, clearance both by road and rail was, therefore, across one of the two swing-bridges, through the timber yard, and over one of the three Rečina bridges to the area behind the Pristanište Brajdica. Hence there is ready access to the road along the east bank of the Rečina which connects inland with the main coastal road. In this area too is Sušak station and its marshalling yards. From their west end the harbour lines cross one of the two southern bridges over the Rečina, fan out to a network of lines on the timber-yard, and end in three spurs—one across the lower canal swing-bridge to serve the buildings on the Pristanište Karadjordjevo, one on to the Gat E. Bačića, and one along the Gat Aleksandra I.

Trade and Connexions. Both Fiume and Sušak have a considerable coastal trade in small sailing vessels, and most of the commodities handled are in transit for Central Europe and Hungary.

The chief imports are mineral oil, metals, phosphates, coal, pyrites, cereals, and cotton, and the main exports are timber, fertilizers, refined oil, live cattle, wine, and cereals.

Statistics of shipping and passenger traffic are as follows:

	1938	1939
Ships entered, number	5,941	5,318
Ships entered, tonnage	2,277,000	2,094,000
Ships cleared, number	5,934	5,316
Ships cleared, tonnage	2,271,000	2,093,000
Goods landed, tons	437,000	518,000
Goods loaded, tons	328,000	425,000
Passengers disembarked	74,142	70,050
Passengers embarked	70,564	65,949

Fiume is a port of call on the weekly service from Venice via Trieste, Zara, and Gravosa to Bari, and on many of the sailings from Venice and Trieste to the Black Sea, the Levant, Africa, the Middle, and the Far East. It is also the terminus of the following services: several times a day to small Istrian ports as far as Moschiena; daily to east Istrian ports as far as Cherso; thrice a week, in summer, to Pola and Ancona (only twice a week from September to June) and to Abbazia, Pola, and Venice (only once a week from September to June); twice a week to Veglia, Arbe, and Zara, and to Zara, Spalato, and Lagosta, with an extension to Gravosa once a week; weekly to Cherso, Pola, Parenzo, Trieste, and Ravenna, to ports on Cherso and Lussin, and thence to Pola, and coastwise to Sicily, Naples, Genoa, Valencia, and Marseilles; and, fortnightly, coastwise to Sicily, Sardinia, and Genoa.

No.	Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
1	Porticciolo del Silurificio	0-23	..	—	Seven lengths of quay, longest 475 ft., shortest 90 ft., in basin and one outside to west. Total length of quays c. 1,760 ft. Private basin of torpedo factory.
2	Porto del Petrolio	..	..	..	Tankers.
	North-west mole	21-26	230	—	Outside rough, with parapet above.
	North quay	c. 22	590	—	Pipe-line to refinery.
	East quay	c. 22	265	—	..
	South mole	17-25	560+190	—	Pipe-lines to refinery.
3	Riva Costanzo Ciano (dei Legnami)	13-60	990	—	Timber.
4	Porto Principale Molo Palermo:				
	West side	c. 15-25	260+73	—	North end rough. Central 260 ft. set forward 32 ft.
	Head	32	165	—	..
	East side	27	520	4	..
	Riva Luigi Rizzo	c. 29	1,180	12	Best-equipped quay.
5	Molo Napoli:				
	West side	c. 29	386	4	..
	Head	23	260	—	..
	East side	24-26	395	4	..
	Riva Thaon de Revel	22-26	1,180	—	Formerly leased to Yugoslavia.
6	Molo Genova:				
	West side	22-26	558	—	..
	Head	22-29	262	—	..
	East side	c. 29	630	—	..
	Riva Duca degli Abruzzi	c. 29	815	4	Grain silo with 4 elevators at west end.
7	Molo Ancona:				
	West side	c. 29	440	—	..
	Head	c. 22	262	—	..
	East side	c. 30	490	—	..
	Riva Capitaneria	19-30	262	—	..
	Riva Dalmazia	17	220	—	Port offices behind north end.
	Riva Emanuele Filiberto:				
	West part	14-19	208	—	..
8	Molo Adamich	..	..	..	Coastal passenger craft.
	West side	c. 13	262	—	..
	Head	23	160	—	..
	East side	21-23	262	—	..
	Riva Emanuele Filiberto:				
	East part	15-21	325	—	Civil seaplane station.
	Molo S. Marco:	..	..	..	Island steamers. Monument at head.
	West side	15-19	220	—	..
	East side	12-18	235	—	Curves into R.N. Sauro at root.

No.	Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
	Riva Nazario Sauro:				
	West part . . .	c. 12	120	—	..
	Molo Stocco . . .	10-c. 18	146	—	Island steamers.
	East part . . .	c. 19	117	—	..
	Triangular quay:				
	West face . . .	c. 18	60	—	..
	South face . . .	c. 12	80	—	..
9	Riva C. Colombo . .	13-26	618+150	—	Northern 618 ft. reported as principal landing-place.
10	Molo Ammiraglio Cagni	..	..	..	South side rough with parapet above.
	First (inner) leg . .	15-23	2,000	1	Swing bridge at eastern extremity. Floating dock moored near east end.
	Second leg . . .	20	1,780	—	Quarantine station at west end. Coal depot immediately to its east.
	Third leg . . .	14-20	500+850	—	Eastern 500 ft. wider.
	Fourth leg . . .	20	338	—	..
	Luka-Sužak				
	Pristanište Karadjordjevo:				
	Main (western) part	28	760	—	Port offices behind. At west end curves into east side of channel to P. Principale.
	North-east leg . .	c. 26	180	—	..
	East leg . . .	c. 26	135	—	At east end turns north-east into west bank of C. d. Fiumara.
	Obala Frana Supila:				
	South part . . .	c. 26	485	—	..
	Gat E. Bačića:				
	North side . . .	26	345	4	..
	Head (oblique) . .	26	95	—	..
	South side . . .	26-48	330	—	..
	Quay to south of mole	c. 26	95	—	4 (?) creosote tanks behind.
	Gat Aleksandra I:				
	Main (inner) leg . .	c. 28	1,040	7	..
	Northward spur . .	c. 23	205	—	Outside face 15 feet longer.
	Outer leg . . .	c. 23	320	—	Fair-weather berth only.
	Lazarus shipyard:				
	West quay, Gat Zaro	c. 23	215	—	Rough on west side. Entirely occupied by workshops.
	North quay . . .	c. 23-26	240	—	Occupied by workshops. East end turns north into west side of channel to P. Principale.
	Canale della Fiumara	..	..	..	Swing bridge at south end and another 200 yds. farther north.
	West bank:				
	Between bridges	c. 13-16	545	—	Slightly dog-legged.
	North of bridge . .	c. 10-13	1,150	—	Slightly curved.
	East bank (Obala Frana Supila) . .	..	..	..	Timber. Both bridges open on to this bank.
	Between bridges	c. 13-16	445	—	..
	North of bridge . .	c. 10-13	1,080	—	..

No.	Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
	<i>Luka Sušak (contd.)</i>				
	F. Rečina:				
	Stone jetty . . .	3-26	195	—	West side continues 185 ft. north as east bank of river. Small passenger steamers.
	Wooden jetty . . .	? 26	107	—	East side 17 ft. shorter.
	Pristanište Brajdica .	c. 36	680	—	Undeveloped. 4 ft. higher than ground behind; reached by ramp at west end.

Inland Communications

Railways. A single-track electrified line runs from Fiume to S. Pietro del Carso where it becomes double track to Trieste and Postumia. There is a Yugoslav main line from Fiume to Zagreb and Budapest. An electric tramway traverses the city.

Roads. Road 14 from Fiume goes to Trieste, road 59 diverging from it for Postumia. Both road 60 to Pisino and road 61 to Pola branch off road 14 near Volosca Abbazia. Two roads lead inland through Jugoslavia.

Airways. There was a seaplane service from Fiume (Abbazia) for Pola and Venice.

TRÁPANI. Latitude 38° 1' N. Longitude 12° 30' E. Population 52,661. Provincial capital. Seat of bishopric. Chamber of Commerce.

Position and Site (Fig. 33)

Trapani, on the north-western coast of Sicily, is built on a low scimitar- or scythe-shaped (Gk. *δρεπαιον*) peninsula which curves west-north-west between the open sea to the north and the long narrow land-locked harbour to the south. The peninsula is about 1½ miles long and 400-900 yards wide, though at its western point it tapers to a chain of rocks. Immediately to the west and south-west of the peninsula are the islands of Lazzaretto, Colombaia, and Scoglio Palumbo, whilst 8 miles farther west are the Egadi islands. On the mainland to the south and south-east of the harbour there extend extensive salt-pans, inland of which a fertile vine-planted plain slopes gently eastwards to a low plateau 5 miles distant. The plain is limited about 1 mile north and north-east of the main part of Trapani by the limestone M. San Giuliano (M. Erice, 2,464 ft.). This

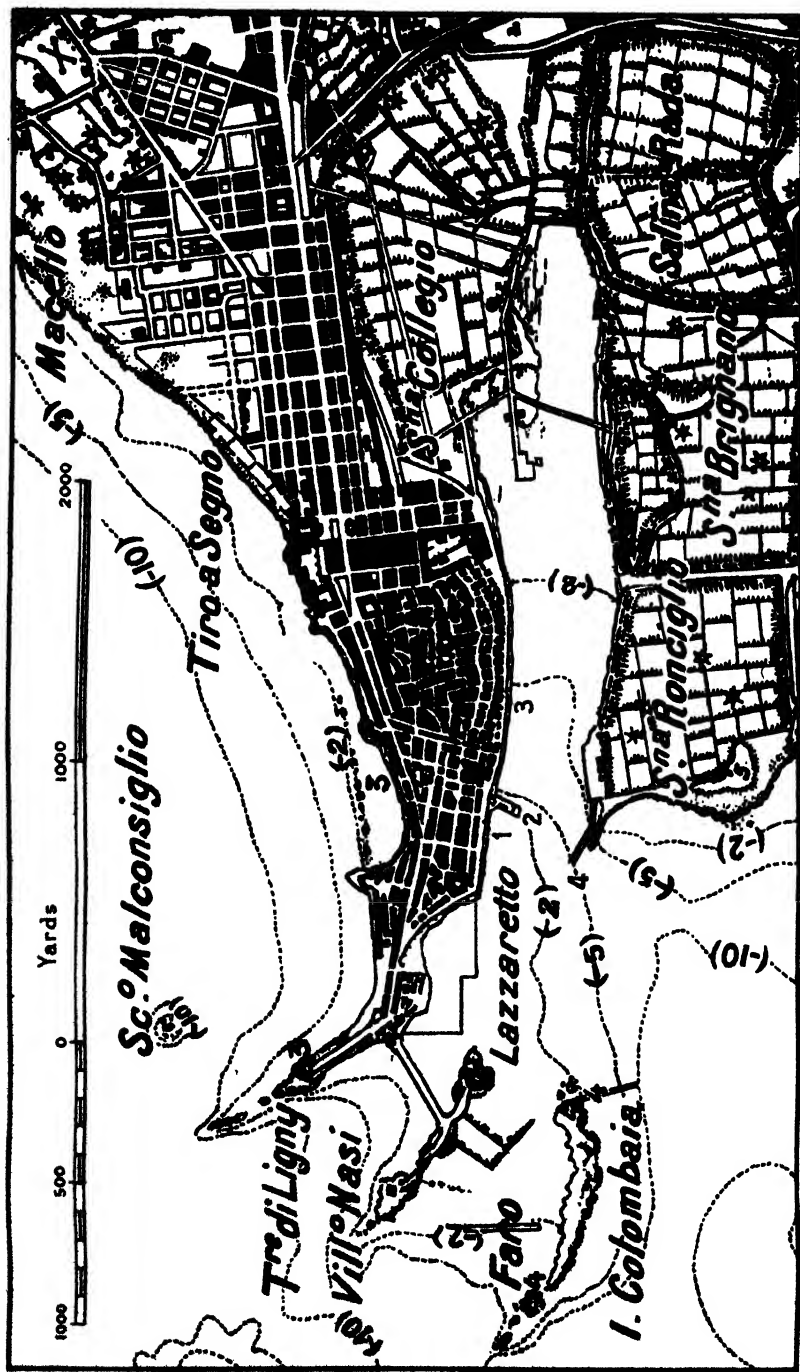


FIG. 33. *Trapani*.

is partly cliff-fringed and rises steeply to its summit, which is crowned by the congested town of Erice, the original settlement.

The coast is low and rocky to the south of the harbour. Immediately north-east of Trapani it is low and is either rocky or sandy from the end of the Trapani peninsula almost as far as Point Pizzo Lungo, where the northern slopes of M. San Giuliano come to the sea.

The main part of the town is tightly packed on the peninsula. The older part, which has very narrow and irregular streets, occupies the middle part of the peninsula between the town hall and the military barracks, whilst the newer part extends eastwards to the western slopes of M. San Giuliano, where Borgo Annunziata is one of the town's newest suburbs. The streets of most of the new town are wide and straight and laid out on a pattern of rectangular blocks. The Via G. B. Fardella runs through the centre of the new town and is continued eastwards across the plateau to Palermo by road 113.

History

Trapani is the ancient Drepanon, which took its name from a Greek word meaning scythe, in reference to the shape of the promontory on which the city stands. Originally the port of Ergyx (Erice), the Carthaginian leader Hamilcar made Trapani a city in 260 B.C. when he destroyed Ergyx and transferred some of the population thither. In 249 B.C. the Carthaginians destroyed the Roman fleet which was besieging the city, but in 241 B.C. Trapani was taken by the Roman consul Catulus, who, in his turn, destroyed the Carthaginian fleet and by his victory ended the First Punic War. Trapani was of no great importance under the Romans, nor under any of its subsequent masters, until, in 1282, Peter of Aragon landed here as the saviour of Sicily from the French. To him and to the Emperor Charles V. the city owed its greatest prosperity until modern times, when it has become an important commercial centre.

Public Buildings and Monuments

Trapani is a modern city with few buildings of interest. The seventeenth-century cathedral of S. Lorenzo has a baroque portico known as the Loggia dei Genovesi, and a Crucifixion attributed to Van Dyck. The Chiesa Nazionale is also in the baroque style (1635) and has finely carved cupboards in walnut wood by Pietro Orlandi (eighteenth century) in the sacristy. S. Agostino was once the Templar's church and is noteworthy for its beautiful façade and rose-window. The church of Sta. Maria di Gesu has a fifteenth-century

façade and a Madonna by Andrea della Robbia. In the Jewish quarter is the curious Palazzo Giudeca with a tower known as Lo Spedadello and fine Renaissance windows. The Santuario dell' Annunziata, in the suburb of that name, contains a thirteenth-century statue of the Madonna and Child, which is an object of great local veneration. In the adjacent convent is the Museo Pepoli, containing sculpture and painting, founded by Count Agostino Pepoli in 1908.

Industry

Trapani is the main market for a fertile agricultural region, and is the centre for the marine salt produced in the salt-pans which extend from the boundary of the town for about 3 miles to the south. The annual output is about 150,000 tons, and salt constitutes the principal export of the port. Picturesque windmills are used for grinding the salt. The preserving in tins or salting in barrels of locally caught tunny fish and sardines is important, and large quantities of both are exported. The other industries of the town are also concerned with local products. Although not such a notable centre as Marsala, wine is made and staves imported for the manufacture of casks and barrels. Other products include pasta, olive oil, flour, chemical manures, and cement tiles. There are limestone quarries near by. Trapani is also a small naval base.

Description of Port

As a port Trapani is second only to Palermo in north-west Sicily. Its small natural harbour is in two parts. The inner harbour, on an inlet between the town and the salt-marshes to its south, is protected by the Pontile della Sanita (2) midway along the south shore of the town and the opposing Ronciglio breakwater (4) built north-west from the south shore. The outer harbour to the west is very exposed on the south, but protected on the west, naturally by the four islands off the end of the peninsula, and artificially by breakwaters built from them.

The seaward approaches, though deep, are restricted by the Egadi islands to the west and south-west, and by other islands nearer the harbour. Anchorage can be had south-west of the harbour or in the roadstead north of the town according to the wind, but in neither is the holding ground good.

The four islands west of the harbour are rocky. The Isola Colombaia and the Scoglio Palumbo lie to the south, and the two islands joined by a sand-spit and known as the Isola Lazzaretto to the north.

The Isola Colombaia has one breakwater, the Scogliera del Passo extending northwards midway along its north shore, and another, the Molo Foraneo, which has vertical sides, built south-south-east from its south-east corner. Lazzaretto is joined to the mainland by a causeway, the Scogliera dei Cappuccini, from the east end of the western island, and has a partially submerged embankment running out from its south side towards the Scogliera del Passo. Entrance to the harbour from the north-west is, therefore, restricted to the gap between these two. As this gap is only about 130 feet wide and 4 feet deep, and is further restricted by fish-ponds on the south-east of the island, it is only of use for small craft.

The main entrance to the port faces south between the head of the Molo Foraneo and that of the Ronciglio breakwater, and is nearly $\frac{1}{2}$ mile wide. Although there are depths of 30 feet in the centre and a deep channel leads north-eastwards to the inner harbour, depths north of a line roughly joining the root of the Molo Foraneo and that of the Pontile della Sanita are everywhere less than 18 feet and mostly shoal. On the north shore a sandy beach lies immediately east of the Scogliera dei Cappuccini, but southwards from it and then eastwards to the Pontile della Sanita the shore is quayed and dredging has been taking place of recent years. There is a small boat camber enclosed by two short jetties on the north-east corner of Colombaia, and a landing jetty on the eastern point of Lazzaretto.

The entrance to the inner harbour is 780 feet wide between the Pontile della Sanita and the Ronciglio breakwater, with depths of 18 to 28 feet. The Ronciglio breakwater is rough surfaced, but both sides of the Pontile della Sanita are quayed. The north side of the inner harbour is quayed for nearly $\frac{1}{2}$ mile eastwards, the main quay being the Banchina Ammiraglio Staiti (3). At its east end are barracks for submarine personnel, and to the east again are two slipways and repair shops for small craft. Most of the harbour east of a line south from the barracks is shoal. The two islands at the head of the harbour have been enlarged and connected by a causeway to each other and to the mainland: they are used for oil storage.

Salt-pans occupy almost the entire southern shore of the inner harbour, except for the Banchina del Ronciglio and the Piazzale del Ronciglio, both near the root of the Ronciglio breakwater.

The surface of the Molo Foraneo is 10 feet above high-water level. The new quays on the north of the outer harbour are about 5 feet high, and those in the inner harbour are about $7\frac{1}{2}$ feet high.

Facilities. The Captain of the Port's office and the customs-house are both behind the west end of the Banchina Ammiraglio Staiti. The only storage accommodation is in the customs-house. There is one crane, a hand crane of 1-ton capacity, on the west end of the Banchina Ammiraglio Staiti.

No stocks of coal are maintained in the port area. The four oil depots lie east of the head of the inner harbour (Appendix II). Water is laid on to the Banchina Ammiraglio Staiti. The only repair shops are those with the two slipways east of the Banchina Ammiraglio Staiti. Craft up to 200 tons can be handled on the slips, the western of which has a frontage of approximately 130 feet and the eastern of 70 feet.

Trapani is a railway terminus. A single track leaves the main line east of the station and serves the Banchina Ammiraglio Staiti and the quay to it west. The western 750 feet are on the quay face and partially duplicated.

The Viale Regina Elena and the Via Ammiraglio Staiti, the two continuous broad roads along the south side of the town, are connected at their east end northwards to the main road inland. The quays along the north of the harbour have access to these roads, although a wall encloses the western end of the new quays and another runs from the root of the Pontile della Sanita immediately north of the railway line to beyond the slipways, with a break opposite the customs-house and several gates.

Trade and Connexions. The chief imports are coal, timber, and cereals, and the principal exports, salt, building-stone, wine, vegetable oil, and fish. The salt is principally responsible for the unusual fact that the exports are considerably greater by weight than the imports.

Statistics of shipping and passengers are as follows:

	1938	1939
Ships entered: number	1,919	2,053
" " tonnage	754,000	637,000
Ships cleared: number	1,913	1,888
" " tonnage	750,000	631,000
Goods landed: tons	87,000	86,000
" loaded: tons	255,000	216,000
Passengers disembarked	11,279	11,529
" embarked	13,303	15,738

There are sailings three times a week to the Egadi islands, and weekly to Palermo, and to Marsala, Pantellaria, Lampedusa, and Porto Empedocle. The port is called at by the weekly service from Genoa to Palermo, and by that from Genoa to Tunis (outward only); by the two services which run four times a month from Genoa to

the various Sicilian ports; and fortnightly by the Palermo-Tunis run and by the coastwise service from Fiume to Genoa.

No.	Name	Depth alongside (feet)	Length (feet)	Facilities, &c.
	<i>Outer Harbour</i>			
	Molo Foraneo . . .	4+	780	Head (60 ft.) widened.
	North shore quays			
	West quay . . .	1½	550	Land behind face not fully re-claimed.
	South quay			
	West part . . .	2-5	470	Stepped back 60 ft. from east part.
	East part . . .	3½	740	New buildings (? naval) behind.
1	Regina Elena quay . . .	c. 2	1,000	..
2	Pontile della Sanita . . .	..	..	Inner 90 ft. cuts off corner to No. 3.
	West side . . .	4½	c. 90 + 220 + 90	Health office close behind southern half. Outer 90 ft. projects westwards c. 40 ft.
	Head . . .	6-24	160	..
	<i>Inner Harbour</i>			
2	Pontile della Sanita:			
	East side . . .	23½	360	..
	Quay east of root of No. 2	23½	130 + 290	Western 130 ft. stepped out 40 ft.
3	Banchina Ammiraglio Staiti	..	..	Depths of 20-24 ft. at 50 ft. off.
	West leg . . .	..	1,400	Jetty, 16 ft. long, 50 ft. from west end. Small break in quay 560 ft. from west end. Port offices and custom-house behind west end.
	East leg . . .	..	550	Submarines berth stern-to. Barracks behind.
4	Banchina del Ronciglio . . .	? 21	800	Large building (? salt-silo) behind east end, with overhead conveyor. No direct access to mainland.
	Piazzale del Ronciglio . . .	c. 6	535	Jetty, 30 ft. long, in middle of quay, and short section to its east set back.

Inland Communications

Railways. Trapani is the terminus of single-track lines to Palermo via Calatafimi and Alcamo and via Marsala and Alcamo. An electric tramway traverses the city from the harbour to the suburb of Annunziata.

Roads. Trapani is the starting-point of road 113 to Palermo and Messina along the north coast and of road 115 to Marsala and Syracuse along the south coast. Secondary roads lead to Castellammare del Golfo and S. Vito lo Capo, and to Salemi and Castelvetro.

Airfield. Milo airfield is about 3 miles east of the town.

MARSALA. Latitude $37^{\circ} 47' N.$, Longitude $12^{\circ} 26' E.$ Population, 24,650.

Position and Site (Fig. 34)

Marsala is situated on the southern side of Cape Lilibeo, the most westerly point of Sicily. The whole town is built on low ground, and outside it the surface rises gradually eastward to about 400 feet at a distance of 4 miles. This rising ground is in parts barren and stony, and the surface is broken by a number of quarries in raised beaches of calcareous sandstone. The higher ground is flanked on each side by more fertile coastal plains, which converge on the town. One small fiumara has cut a miniature valley to the coast 3 miles to the south-east, but otherwise there are no well-formed valleys.

The old walled town is rectangular in shape, with its longest sides, which have a length of about 700 yards, orientated from north-west to south-east. It is separated from Cape Lilibeo itself by cornfields and extends southwards to the north-west corner of the harbour. The streets in the old town are straight but mostly narrow, and are partly arranged in a grid pattern parallel with the town walls. A main road leads north-east from the harbour area into the town, but the walled area is entered through narrow archways. Newer extensions from the old town have spread eastward to the railway and south-east along the road to Mazara del Vallo.

The only industrial area consists of the large wine-establishments between the railway and the shore south-east of the harbour.

History

Marsala is the ancient Lilybaeum, the city founded by the Carthaginians in 396 B.C. round the headland which forms the westernmost extremity of Sicily. It became the strongest bulwark of Carthaginian power on the island, resisting the assault of Pyrrhus in 296 B.C. and only succumbing to the Romans after a ten years' siege (250-241 B.C.). The Saracens named it Mars-al-Allah, or harbour of God, whence comes its present name, and it continued under their dominion to serve as the principal port of communication between Sicily and Africa. In the sixteenth century Charles V almost completely blocked the harbour as a measure of protection against raids from the Barbary pirates. From that time its prosperity waned while that of Trapani increased. The wine trade for which it is famous was founded by an Englishman, John Woodhouse, in 1773. Two British warships stationed there for the protection of the wine merchants rendered

unofficial assistance to Garibaldi when he and The Thousand effected a landing at Marsala on 11 May 1860 and entered upon their campaign of liberation.

Public Buildings and Monuments

The cathedral, dedicated to St. Thomas of Canterbury, has an unfinished baroque façade and a spacious interior with fine columns of marble and granite, which, according to tradition, were intended for Canterbury Cathedral. Over the high altar is a picture of the martyrdom of St. Thomas. Eight splendid Flemish tapestries of the sixteenth century representing scenes from the capture of Jerusalem by Titus are seldom exhibited. Apart from the cathedral, Marsala has no public buildings of interest, although the huge wine cellars, now owned by the combine of Florio, Ingham-Whitaker, and Woodhouse, are worth a visit (III, Plate 64).

Industry

The whole economy of Marsala is based on the production of Marsala wine, which is the town's principal export. There are several establishments engaged in its production, but the principal is the recently formed combine of S. A. Vinicola Florio, Ingham-Whitaker, and Woodhouse, which has an annual output of about 4,500,000 gallons. Associated with the wine industry are a distillery, a firm making vinegar, several producers of must, and manufacturers of wine casks and barrels.

Salt is prepared near the port, although Trapani is the main centre of this industry (I, Plate 34). Other industrial establishments include flour mills, soap works, and brick and lime works. There are several quarries near the town.

Description of Port

Marsala owes its importance almost entirely to the wine trade, and its water-front is largely taken up with large wine establishments. The harbour, facing south-west, is artificial, small, and shallow, being available for ships 350 feet long and of 18 feet draught. It is formed by two moles, the Molo di Ponente and the Molo di Levante, built respectively southwards from a point to the north-west of the harbour and then curving to the south-east with a length of about 1,000 yards, and from a point on the south-east of the harbour westwards, slightly dog-legged, for about 450 yards. The entrance to the harbour, which is some 650 feet wide with depths of 20 feet in mid-channel between the two moles, has been further protected by the Diga Foranea, a

breakwater some 600 yards long, built southwards from near the head of the Molo di Ponente.

The approaches to Marsala are free of obstruction, but shallow water extends some way off the stretch of coast north-westwards from the harbour to Cape Lilibeo, a distance of $1\frac{1}{4}$ miles. There is good holding ground about $\frac{3}{4}$ mile south-west of the port, but the anchorage is exposed to winds between west and south.

Inside the harbour depths are shallow and most of the shore-line is shoal, but depths of 18 feet and of 13 feet respectively have been dredged to the two main quays, the Banchina dei Mille towards the north-west end of the water-front and the Pontile Florio, two-thirds of the way out along the Molo di Levante. The protective breakwaters are constructed of rough blocks, but there are quays at the southern end of the inside of the Diga Foranea, along the whole length of the Molo di Ponente, and, as mentioned above, along the Pontile Florio. In the north of the harbour at the root of the Molo di Ponente there is a curved beach and to its south-east a length of quay from whose southern end the Banchina dei Mille is stepped out. South of this quay is the seaplane station with a slipway and, at its south end, a jetty projecting south by east. The rest of the shoreline is undeveloped except for a short jetty mid-way at the south corner of Woodhouse's wine establishment. Outside the harbour to the south-east of the Molo di Levante several small jetties serving wine establishments project from the shore: the largest is the most south-easterly, and about 700 yards from the root of the mole.

All quays and jetties are between 5 and 6 feet in height, and ships berth both alongside and stern-to.

Facilities. The office of the Captain of the Port is behind the quay north of the Banchina dei Mille and the customs-house is just to its north-west at the root of the Molo di Ponente. The Health Office is at the head of the mole.

The three buildings behind the Banchina dei Mille are warehouses, and the customs-house has storage space.

The port carries no bulk supplies of either coal or oil. The Banchina dei Mille is, however, reported to have two hydrants.

Small craft can be hauled up on the beach at the root of the Molo di Ponente and on the seaplane slip, but nothing more than the simplest repairs can be executed.

The harbour is not served by rail. A fair road runs along or just behind the water-front, connecting at each end and in the centre directly to routes leading inland north-east and south-east.

Trade and Connexions. In normal years the number of ships entering and clearing the port is about 1,000, with an average tonnage of from 350,000 to 450,000 tons. Between 1936 and 1938 the annual discharge of goods varied between 35,000 and 57,000 tons and the clearance between 40,000 and 60,000 tons. The chief imports are coal and timber, and the chief export is wine, with building stone, vegetable oil, salt, and cereals following.

<i>Name</i>	<i>Depth alongside (feet)</i>	<i>Length (feet)</i>	<i>No. of cranes</i>	<i>Facilities, &c.</i>
Diga Foranea . . .	..	..	—	Breakwater, about 1,800 ft. long, faced on both sides with rough boulders, except at south end of eastern side, where it is quayed. A parapet runs along western side.
Quayed (southern) part	16 to 10	600	—	..
Molo di Ponente (in 5 sections, numbered from south-east to north)	..	..	—	Curved breakwater, about 1,000 yards long, faced on its seaward (SW.) side with loose blocks, except for inner 300 yards, where recently reclaimed marshland borders NW. side of root. Harbour side of head is also faced with loose blocks; these blocks extend, as a spur, about 40 ft. east from the head. Parapet, about 18 ft. above water, runs along west side of sections 2, 3, and 4.
1. (South-east) . . .	18 at 50 ft. off	575	—	A wall, about 10 ft. high above sea-level, runs along greater part of SW. side.
2.	c. 5 along-side; 7 at 100 ft. off	800	—	..
3.	1 to 5	525	—	..
4.	c. 5 along-side; 9 at 80 ft. off	460	—	Used by coasting schooners, which berth stern-to.
5. (North) . . .	0 to 5	640	—	..
Quay in front of Port Offices . . .	1 to 4	400	—	..
Piazzale dei Mille: North-west end	13 to 4	160	..	..
Banchina dei Mille (dog-legged) . . .	..	..	—	Banchina dei Mille is quayed SW. side of Piazzale dei Mille. A wall on eastern side of Piazzale separates it from Seaplane station.

Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
North-west leg .	18 (dredged)	320	—	Dredged berth is 320 ft. wide.
East leg . . .	18 (dredged)	190	—	Dredged berth is 320 ft. wide.
Seaplane Station Curved frontage	10 at 40 ft. off	420	—	Frontage is broken by a small inlet 60 ft. wide and by the seaplane slip (28 ft. wide).
Jetty south of seaplane station				
Root (south-west side)	3½	260	—	..
Jetty: West side . . .	6 alongside; 9 at 100 ft. off	320	—	East side of root is beach of rock and weed.
East side . . .	c. 2			
Jetty of Woodhouse's wine-establishment	4 (north side and head); 3 (south side)	130	—	Has rounded head.
Molo di Levante (slightly dog-legged)		c. 1,600	—	Mole is faced on both sides with loose blocks, except for Pontile Florio (about 1,000 ft. from root). Road about 20 ft. wide along mole.
Pontile Florio . .	14	130	—	..
Jetty of Ingham's wine-establishment (southernmost and largest of jetties south of harbour)	4 to 5 at and near head	180	—	Situated about 670 yards south of harbour. North side is silted up for half the length, but south side has water right up to root.

Inland Communications

Railway. Marsala is on the single-track line from Trapani to Alcamo and Palermo via Castelvetro.

Airways. From the Stagneni seaplane station, to the east of Punta d'Alga, services formerly operated to Lidb di Roma, Tripoli, and Tunis. There is another seaplane station in the harbour.

Roads. Marsala is on road 115 along the coast from Trapani to Syracuse, whilst another main road leads inland to Salemi where it branches for Calatafimi, on road 113, and for S. Ninfa, on road 119.

PORTO EMPÉDOCLE. Latitude 37° 17' N. Longitude 13° 32' E.
Population 13,834.

Position and Site

Porto Empedocle, the port for Agrigento (p. 1), is built on a narrow strip of coastal plain backed by a steep slope more than 150 feet

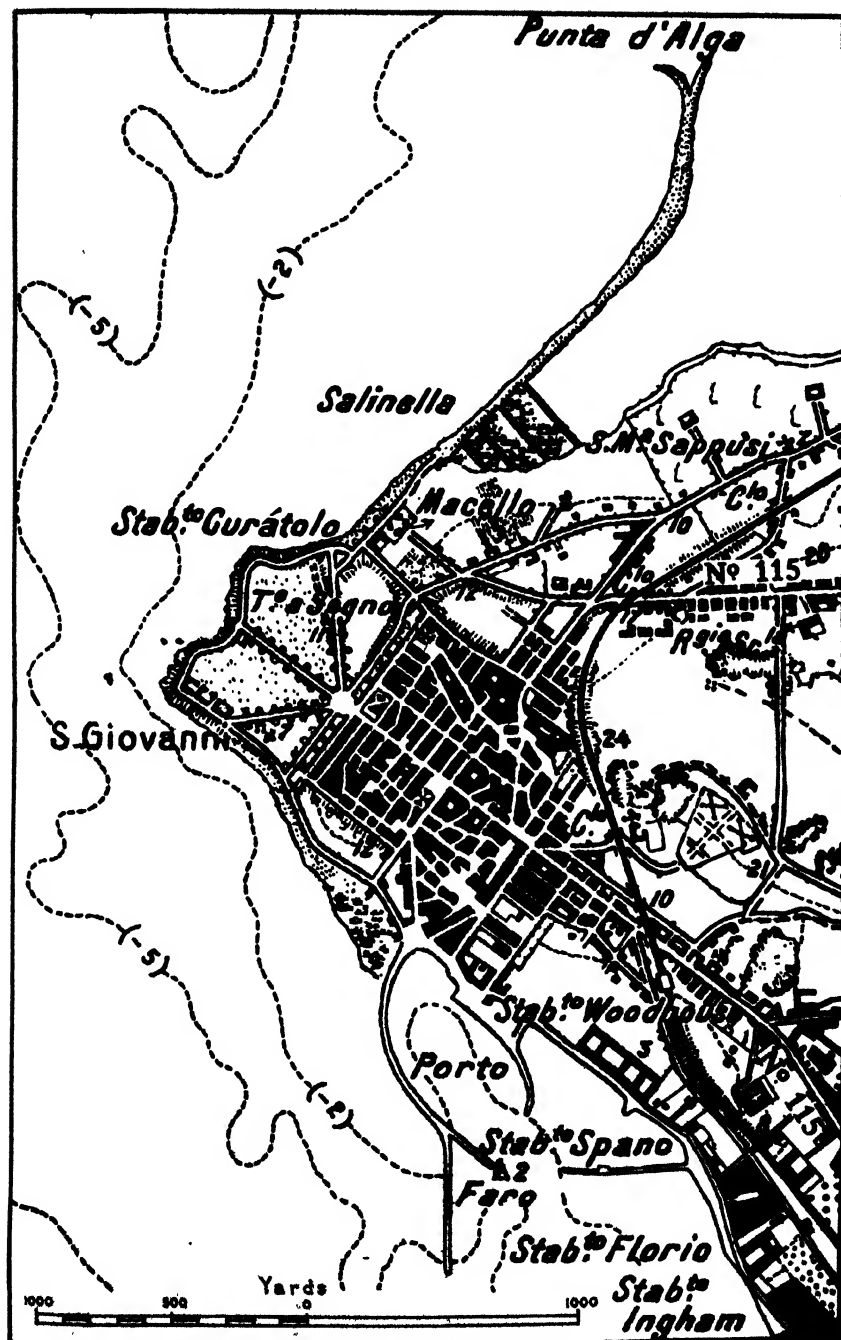


FIG. 34. Marsala

high, which is interrupted by two ravines over 100 feet deep. One of these enters the north-east part of the town and the other reaches the shore $\frac{1}{2}$ mile to the west. Neither of them is, however, wide enough to allow the town to spread inland or to cause any natural indentation of the coast at their mouths. Above the steep slope and between the ravines the country rises inland to a height of about 300 feet in 1 mile, and more steeply to over 1,000 feet in about $1\frac{1}{2}$ miles from the shore, and is covered with olive groves and vineyards.

The built-up area of the town is largely confined to the coastal strip by the steep slope, and is mostly concentrated close to the harbour, only spreading inland for about $\frac{1}{2}$ mile. The Port Offices, customs-house, churches, school buildings, and the market are near the harbour, and part of the area which could be built on is used in normal times as a sulphur dump. On the east small factories and the power station lie close to the railway, which is forced to keep near to the coast, while to the west a single line of houses follows the landward side of the coastal road as far as the mouth of the gorge. There is only an insignificant spread of buildings above the bluff. One main street in the town, the Via Lincoln, is wide and tree-lined, but the other streets are narrow and some are steep.

History

The harbour of Porto Empedocle was made in the second half of the eighteenth century, on the initiative of the Bourbon king, Charles III. Columns and other material from the temples of Agrigento were largely used in the construction. Until 1852 it was known as Molo di Girgenti, but it was then renamed after the famous Greek philosopher Empedocles, who was a citizen of Agrigento. Porto Empedocle has no public buildings nor monuments of interest.

Industry

The main industrial establishments of the district, which are for the most part small, are at Agrigento, though there are at least four notable works connected with the sulphur industry (refining and grinding) at the port. Other industrial establishments include flour mills, furniture factories, soap works, lime-kilns, and mills for grinding gypsum.

Description of Port

Porto Empedocle, the only well-sheltered harbour on the south coast of Sicily, has an outer harbour, the Avamporto, protected on the

east by a curved breakwater (Molo del Littorio) and on the west by a dog-legged mole (Molo dell' Impero) overlapping the former, and an inner older harbour, the Porto Vecchio, protected by the Molo Vecchio (also known as the Molo F. Crispi), built in three legs on its west and south.

The approaches are deep and unobstructed apart from the Melville shoal (La Secca) some 4 miles south-south-east of the harbour entrance. Anchorage is available off the port, but it is exposed, and although inner anchorage is possible in the Avamporto, the movement of shipping would quickly become obstructed.

The Molo del Littorio is rough-faced except for the south-western 580 feet of the inside, but provided with bollards. The Molo dell' Impero is rough-faced on the outside and on the inside of the southern leg: the inside of the northern leg is quayed but fringed with isolated rocks. Its purpose is purely protective. The entrance to the Avamporto between these two works faces south-east and is 650 feet wide at its narrowest with depths of 18 to 26½ feet. Depths in the outer harbour are from 18 to 24 feet in the south-east, but the north-west, with its hauling-up beach on the north shore, is shoal. A low quay has recently been constructed along the west side of the first leg of the Molo Vecchio.

The Molo Vecchio is the original protective work of the old harbour and is quayed throughout the whole length of its inner side. The distance between its head and the Molo del Littorio is 640 feet, and depths of 18 feet or more are available over a width of about 500 feet. The Porto Vecchio is roughly 280 yards by 400 yards in size and can accommodate ships not exceeding 390 feet in length and 21 feet draught. A quay, the Riva Vittorio Emanuele III, has recently been built along the shore eastwards from the root of the Molo Vecchio.

Discharge is by ships' appliances, when alongside into railway wagons and lorries, or when at anchor or berthed stern-to into lighters. The quays of the Porto Vecchio are about 5 feet high, though the first leg of the Molo Vecchio is only some 3 feet in height.

Facilities. The customs-house is behind the west end of the Riva Vittorio Emanuele III, and the Port offices are approximately 140 yards to its north-west at the end of the Via Lincoln. The port is not well equipped. There are no cranes, and the only warehouses are the customs-house and the buildings behind the eastern half of the Riva Vittorio Emanuele III. In peace-time a stock of 3,000 tons of coal was maintained, but there was no bulk oil storage. Water is only

laid on to the middle leg of the Molo Vecchio. Such repair facilities as exist are only for small craft, and details are lacking. Repair shops are probably located on the beach at the head of the Avamporto, and there is possibly a small slipway.

The Riva Vittorio Emanuele III and the north part of the Molo del Littorio are served by a standard-gauge line which runs north-east to the marshalling yards west of the town station. The narrow-gauge line west to Castelvetro passes behind the Riva Vittorio Emanuele III. Road traffic from the Porto Vecchio leaves the port area at either end of the Riva Vittorio Emanuele III, the exit at the west end leading directly into the main south coast road.

<i>Name</i>	<i>Depth alongside (feet)</i>	<i>Length (feet)</i>	<i>Facilities, &c.</i>
Molo Vecchio . . .	..	..	Centre raised, separating outside from inside.
Outside			
First leg . . .	3-6	275	Quay may slope north to south.
Second leg, jetty . .	c. 6	50	Leg rough-faced except for jetty c. 35 ft. wide.
Third leg . . .	8-12	355	Eastern 160 ft. stepped out; only possible part to berth alongside.
Head . . .	10	160	Only for boat landings.
Inside			
Third leg . . .	10	378	Eastern 140 ft. stepped out.
Second leg . . .	2-6	675	..
First leg . . .	2-3	235	Fishing-craft. Face possibly stepped.
Riva Vittorio Emanuele III .	20	950	Shoal at west end. Customs-house behind west end. Warehouse behind east end. 130 ft. of dog-legged quay connecting east end to root of Molo del Littorio.

Trade and Connexions. The development of the port has been largely due to the need for a harbour from which to ship the sulphur of Agrigento province and a refuge for the south-coast fishing fleets. Sulphur is by far the most important export, others being gypsum, rock-salt, and wheat. The main imports are coal, phosphates, cement, and timber.

In 1938, 681 ships totalling 344,500 tons entered and cleared the port; goods discharged amounted to 97,765 tons, and goods cleared to 230,016 tons.

A local service connects the port via Lampedusa, Pantellaria, and Marsala to Trapani weekly. The Fiume-Sicily-Genoa service calls fortnightly, and two of the Genoa-Sicily services call, one four times a month and the other in alternate weeks.

Inland Communications

Railways. From Porto Empedocle the railway is mixed gauge to Agrigento, whence the standard-gauge line continues to Aragona and Caltanissetta Xirbi and the narrow gauge to Canicatti and Licata. To the west of Porto Empedocle the narrow-gauge line extends to Magazzolo and Castelvetro.

Roads. Porto Empedocle lies between Mazara del Vallo and Licata on the south-coast road 115 from Trapani to Syracuse. A secondary road as well as road 118 lead to Agrigento, whence the latter continues to Corleone and Palermo and road 122 to Canicatti.

LICATA. Latitude $37^{\circ} 51'$ N. Longitude $13^{\circ} 56\frac{1}{2}'$ E. Population 30,641.

Position and Site (Plate 42)

Licata, about midway along the south coast of Sicily, lies immediately west of the mouth of the F. Salso; and, although this is one of the larger rivers of Sicily, the harbour is constructed beside and not around its mouth. The hinterland consists of a treeless plain about 3 miles wide and mostly below 100 feet, but an isolated ridge, about 560 feet high, extends along the coast for 3 miles west of the mouth of the Salso. The town is built between the river's mouth and the east end of this ridge, most of which is planted with vineyards and olive groves. The Castel S. Angelo on the eastern end of the ridge at 440 feet dominates the town.

Most of the town is below 150 feet, and the older part near the harbour includes the principal church and the town hall. The greatest extension of the newer part is north-west along the two main roads out of the town which round the end of the coastal ridge. There has been but little expansion of the town across the river, and the road and railway bridges here afford the only crossing for heavy traffic for some 15 miles. Most of the wide streets lead to the main exits from the town; apart from these the streets are narrow, especially in the old southern quarter. The railway yards intervene between the town and the river bank, whilst most of the various sulphur refineries and chemical works extend either between the railway and the river, or between the foot of the Molo di Ponente and the foot of the eastern end of the ridge.



PLATE 42. *Licata*

History

Licata occupies the site of a city founded by Phintias, tyrant of Agrigento, about 280 B.C.; he peopled it with the inhabitants of Gela, after his destruction of that city, and named it Phintias after himself. In 256 B.C. its waters were the scene of a famous naval battle in which Attilius Regulus defeated the Carthaginian fleet. Seven years later the Carthaginian general, Carthalus, favoured by a storm, here destroyed a large fleet of Roman transports *en route* for Africa. Early in the thirteenth century Licata was already a flourishing city, as the remains of its walls and gates testify. In the second half of the seventeenth century it acquired fresh importance owing to the stimulus to its development given by Philip IV of Spain, and in the eighteenth century it was one of the first ports in Sicily.

Public Buildings and Monuments

The principal church of Licata is known as the Chiesa Madre. A former Carmelite convent, now an orphanage named after Queen Margherita, preserves some relics of fourteenth-century architecture and a large fifteenth-century triptych.

Industry

Licata is an agricultural market for locally grown cereals, grapes, olives, oranges, and apples and pears, as well as a fishing centre. It is one of the three principal ports for the export of Sicilian sulphur and has several refineries, one of which is the largest in Europe. Asphalt is also exported. The Montecatini chemical works, which make sulphuric acid and chemical fertilizers, is the largest industrial establishment in the town. Other industrial plants are mainly connected with processing agricultural products and include olive-oil presses and pasta factories.

Description of Port

Licata is a small artificial harbour, and, in spite of ambitious plans, has never been highly developed as it is very prone to silting. The harbour is well sheltered from all directions. On the west the Molo di Ponente extends south-south-east for about 350 yards from the shore. This mole is faced on both sides with rough blocks and at its root another rough-stone breakwater, the Molo Martello, extends east-north-east into the harbour enclosing a sand or gravel slipway between it and the shore. Protection on the east is afforded by the Molo di Levante, which is rough-faced along the whole of its seaward

side. Its inner northern part extends south-south-east from the shore and is quayed for 1,120 feet. The outer part curves south-west for about 1,650 feet, and although bordered on the harbour side by rough blocks and an extensive sandbank, is used by harbour craft mooring stern-on. The entrance to the harbour between the Molo di Ponente and the Molo di Levante is about 300 yards wide and is protected by the outer breakwater, which overlaps the two moles. The outer breakwater is about 2,420 feet long and curves from its north end, about 218 yards west-south-west of the head of the Molo di Ponente, to its east end, about 305 yards south of the head of the Molo di Levante. Faced with loose blocks on the seaward side, this breakwater has been breeched by rough seas and no attempt has been made to repair it. The harbour side is equipped with bollards every 100 feet and also with landing-steps; it is used for stern-on mooring when the harbour is congested.

The curved shore between the Molo Martello and the root of the Molo di Levante consists from west to east of the Cantiere Grazie, the Calata d'Agnese, and a curved beach interrupted by a stone pier and a jetty. The Cantiere Grazie is a small shipyard with two patent slips, one with a capacity of 400 tons and the other of 120 tons. There is a short stretch of foul ground between the patent slips and the five sulphur loading jetties of Calata d'Agnese. The westernmost of these jetties has a depth of about 6 feet at its head and the others of about 3 feet; all have a length of about 35 feet. The curved beach stretching eastward to the root of the Molo di Levante is used for beaching harbour-craft and fishing-craft. The stone pier in the middle of the beach is 135 feet long and has a depth of 4 feet at its head. The jetty near the root of the Molo di Levante has a length on its north side of 60 feet, and on its south of 100 feet; it is backed by a large building behind which is the customs-house. The Calata Marianella, close west of the root of the Molo di Ponente, is the only part of the harbour outside the main breakwaters.

Facilities. The customs-house is near the root of the Molo di Levante, on which the Port offices are situated. Apart from the customs-house there appears to be no warehouse accommodation, and ships have to use their own appliances to discharge cargo. Ships at moorings or at anchor discharge into lighters, and those alongside the Molo di Levante quay direct into railway wagons. The Calata d'Agnese is also served by rail.

Stocks of about 1,000 tons of coal are normally kept, but there is no bulk storage of oil. The water supply is poor.

Trade. The tonnage of merchandise discharged and cleared amounted in 1937 respectively to 80,914 and 173,908, and in 1938 to 93,859 and 155,983. The principal imports were coal and building material; sulphur was by far the most important of the exports, followed by agricultural products and salted fish.

Inland Communications

Railways. Licata is on the single-track line from Syracuse via Gela to Canicatti, the junction for Caltanissetta Xirbi and Agrigento. A narrow-gauge line via Margonia also leads to Canicatti and Agrigento.

Roads. Licata lies between Porto Empedocle and Gela on road 115, where it is joined by road 123 to Canicatti.

PALERMO. Latitude $38^{\circ} 7\frac{1}{2}'$ N. Longitude $13^{\circ} 22'$ E. Population 339,497. Provincial capital. Seat of archbishopric. University. Chamber of Commerce. British Consul.

Position and Site (Fig. 35; Plates 43 and 44)

Palermo, on the north-west coast of Sicily, is built on the Conca d'Oro, a plain bordering the south-west shore of the gulf of Palermo. This fertile plain slopes gently to an amphitheatre of steep hills about 2,300–3,300 feet high about 3–4 miles inland. To the north of Palermo, however, the plain narrows to $1\frac{1}{2}$ miles, where it is forced inland by the isolated and steep-sided limestone block of M. Pellegrino (1,968 ft.) and only comes to the coast again near the sea-side resort of Mondello. M. Grifone, about 4 miles south-east of the city, comes within about $1\frac{1}{2}$ miles of the coast and also limits the Conca d'Oro to a narrow coastal strip which disappears entirely near M. d'Aspra (1,234 ft.), another steep-sided limestone headland. The plain is widest on the south-west where the valley of the F. Creto extends past Monreale into the surrounding amphitheatre of mountains. The Conca d'Oro is noted for its fertility and is cultivated with orange and lemon groves, vineyards and orchards from the outskirts of the city to the foot of the steep slopes of the surrounding mountains, which are bare except for patches of woodland here and there. Finally, the plain, together with its narrow extensions, has enabled a number of important routes to converge on the city from all directions.

Palermo now extends from the foot of M. Pellegrino (I, Plate 37) in the north to the F. Oreto in the south-east. The old town, a congested area of narrow and irregular streets, is built round the original harbour, the Cala, and is only about $\frac{3}{4}$ -mile long from north to south between

the Via Cavour and the Via Lincoln and about $1\frac{1}{4}$ miles wide from east to west. Most of the important public buildings are still in this area, but the life of the town is moving to the modern districts with wider and more regular streets north of the old town. The Piazza G. Verdi is now an important centre. The majority of the modern residential quarters are to the north and north-west of the city and are extending inland along the main roads. Monreale, the old Norman town, about 6 miles inland, is now almost a suburb of the city. A smaller residential area has grown up on the south between the old town and the F. Orte. The main industrial and shipbuilding districts extend along the shore for about 2 miles north of the harbour, whilst in the western outskirts there are other industrial suburbs.

History

Palermo was originally a Phoenician colony dating from the sixth century B.C. Despite its Greek name of Panormus, meaning 'all harbour', it was never a Greek city, but was one of the chief centres of the Carthaginians in Sicily until in 254 B.C. it was conquered by Rome and became a flourishing Roman municipium. Taken first by the Vandals and then by the Ostrogoths, it was recovered for the Empire by Belisarius (A.D. 535). In 831, four years after their first landing at Mazara, the Saracens made themselves masters of the city, after protracted resistance in which a high proportion of the population perished. But recovery was rapid and for over two centuries Palermo prospered under Arab rule. It was made the capital of the island, and the life of the city was marked by the refined style of living and intellectual activity which distinguished the courts of Cordova and Cairo. In the course of the Norman conquest of Sicily Robert Guiscard blockaded Palermo from the sea until, in 1072, it fell into his hands. His younger brother Roger was made Count of Sicily, and on Christmas Day 1130, the second Roger, having united the entire Norman dominion under his sway, was crowned King of Sicily, Apulia, and Calabria in the cathedral of Palermo. Roger II and his two successors, William I and William II (1130-1189), endowed Palermo with great buildings and made it an important commercial centre. After the fall of the Norman kingdom, Frederick of Hohenstaufen (1198-1250) made Palermo for the third time a capital, and as the seat of his brilliant court it reached the highest point of its prosperity and culture. Here Italian poetry was born and the study of science and philosophy gained fresh impetus. Charles of Anjou's victories over Manfred and Conradin won him the Sicilian

kingdom, but his rule over the island was of brief duration. Heavy taxation and the oppressions of the French soldiery had aroused widespread discontent when an insult to a young married woman on her way to the church of S. Spirito, outside Palermo, in 1282, provoked the rebellion known as the Sicilian Vespers. The city rose to the cry of 'death to the French', and John of Procida led the revolt which drove out the Angevins and placed Peter of Aragon on the Sicilian throne. From that time until 1715 Sicily was under Aragonese rule, but her kings seldom visited her and it was only when the Spanish viceroys made Palermo their residence that the city recovered some of her former prosperity. The treaty of Utrecht assigned Sicily to the Duke of Savoy, who came to Palermo to take possession of his new dominion. After a few years the island was handed over to Austria, and in 1734 it became part of the Bourbon Kingdom of the Two Sicilies. During the Napoleonic period Palermo became once more the seat of a court, as Ferdinand IV took refuge here when driven from Naples. After 1815, revolutionary feeling in Palermo was strong, and the city suffered much for her share in the revolts of 1820 and 1848. Her liberation came on 27 May 1860 with the victorious entry of Garibaldi. Few cities are more beautiful than Palermo; her situation and her climate rather than her history have earned her the title of *Felice*.

Public Buildings and Monuments

Palermo has numerous monuments of great historic and artistic interest. The cathedral of the Assunta was founded in 1185 by Archbishop Gualterius Offamilius, a royal councillor, believed to be an Englishman, whose tomb is in the crypt. A Christian basilica once stood on this site, but the Saracens turned the building into a mosque, of which a column in the south porch inscribed with a passage from the Koran is probably a survival. Outside, the general appearance of the building is that of a fortress or a palace rather than a church, and the eighteenth-century dome by the Florentine architect Fuga adds an element of incongruity. In the south aisle is a sumptuous group of royal tombs, including those of Roger II (d. 1154), his daughter Constance, the Emperors Henry VI and Frederick II (her husband and son), and Peter II of Aragon (d. 1342). The Palazzo Reale is a building of Saracen origin, enlarged by the Normans, and subjected to many later alterations. The Torre di Sta. Ninfa and the Cappella Palatina are the chief survivals of Norman times. This last is a jewel of Norman-Saracenic art, with exquisite

mosaic decorations, forming one of the finest artistic monuments in Italy. A third monument of first-rate importance is the Museo Nazionale, famous for its sculptures from Selinus of the early Greek period, and containing archaeological collections, relics of the Norman period, and Renaissance and baroque paintings and sculptures. Among the Norman churches of Palermo, S. Giovanni degli Eremiti, built by Roger II in 1132, is one of the most attractive and characteristic. Sta. Maria dell Ammiraglio, generally known as La Martorana, from its later connexion with a convent of that name, was founded in 1143 by King Roger's Admiral, George of Antioch. Here in 1282 the Sicilian Parliament met after the expulsion of the French and decided to offer the crown to Peter of Aragon. The neighbouring, and much smaller, church of S. Cataldo has been carefully restored to its primitive Norman-Saracenic form. Churches of a later date include S. Domenico, with the tombs of many distinguished Sicilians, the adjacent Oratory, which has an altar-piece by Van Dyck representing the Virgin of the Rosary with St. Dominic, and the baroque church of S. Giuseppe dei Teatini. Of Palermo's open spaces, the Piazza Vigliena, or Quattro Canti, is noteworthy for the statues of Spanish kings, Seasons, and Virgin saints of Palermo which surround it; it was laid out in 1609 by the viceroy of the day. The Villa Giulia is a typical eighteenth-century garden, and the adjoining Orto Botanico is famed for its tropical vegetation. The University, housed in a former Theatine monastery, is attended by some 2,000 students. The most beautiful Norman church in Sicily is not in Palermo itself but some 4 to 5 miles away in the little town of Monreale, which has sprung up round it. Begun by William II in 1176, it contains his tomb and that of William I. The walls are covered with a magnificent series of mosaics, and the cloisters, which alone survive of the original monastic buildings, are a masterpiece of twelfth-century art. On the outskirts of Palermo are the Norman castles of La Zisa and La Cuba, erected by William I and William II on Saracenic models.

Industry

Palermo, although the capital and largest city in Sicily, is not a major industrial centre. The shipbuilding yard of the Cantieri Navali Riuniti, which is capable of building destroyers and medium-sized cargo ships, is the most important industrial establishment. The aircraft factory, although employing 800-1,000 workers, does not have a large production. The majority of the other notable

industries are concerned principally in the processing of local products. The canning and preserving of vegetables, tomatoes, anchovy, and tunny, and the production of fruit juices, essential oils (mainly for perfume), candied peel, and calcium citrate (for the manufacture of citric acid) are particularly important. Olive oil, sulphur oil, soap, and sumac extract for tanning are also produced locally. Altogether there are over twenty canneries, as well as flour mills, pasta factories, breweries, and chocolate factories. Other industrial establishments include chemical works, cement works, foundries, engineering shops making marine engines, tanneries, glass works (mirrors), pottery works, furniture, tobacco, and boot and shoe factories.

Description of Port

The harbour lies in the south-west of the gulf of Palermo and faces east. Except for the circular southernmost basin, called the Cala, it is entirely artificial. Protection is afforded by two opposing moles, the Molo Nord and the Molo Sud, and has been increased by the Diga Foranea, originally a detached breakwater built to cover the entrance between the moles and now joined at its north end to the Molo Nord.

The approaches are deep and unobstructed. Anchorage is possible in the gulf anywhere that depths permit, the best being south-east of the Molo Sud. Anchorage in the harbour would seriously obstruct the movement of shipping.

The entrance, between the head of the Diga Foranea and that of the Molo Sud to its west, is about 850 feet wide with depths of 90 feet, and faces south. The distance between the heads of the two moles is rather more than 1,000 feet with depths of 66 feet. General depths in the harbour are from 19 to 29 feet.

The L-shaped Diga Foranea forms a rectangular outer basin and gives a considerable length of quayage, but without any facilities. Southwards from the entrance the Molo Sud and the still-undeveloped Molo Trapezoidale enclose a rectangular basin from whose southern end the Cala extends south-west. The circular head of the latter is shoal and can only be used by small craft. The main commercial quays are to the west of the harbour, where three jetties (Vittorio Veneto, Piave, S. Lucia) have been constructed comparatively recently. North of these jetties, a fourth, the Pontile Ferroviario, is older, and from it quays extend north and east to the dry dock at the root of the Molo Nord. This area is the shipyard of

the Cantieri Navali Riuniti, which also controls the building-slips outside the harbour near the root of the mole.

Berthing is usually alongside with direct discharge on to the quays, but lighters are available for unloading from vessels moored stern-to. The approximate heights of quays are as follows: 10 feet on the Diga Foranea; 6 feet and 8 feet respectively on the Molo Nord and the Molo Sud; 8 feet and 5 feet respectively on the entrance quays and the inner quays of the Cala; 8 feet on the quays from the Molo Trapezoidale to the three new jetties inclusive; $5\frac{1}{2}$ feet in the north-west and north of the harbour; and 6 feet on the quays of the ship-yard.

<i>Name</i>	<i>Depth alongside (feet)</i>	<i>Length (feet)</i>	<i>No. of cranes</i>	<i>Facilities, &c.</i>
Diga Foranea . .	34-100	2,370 +680	—	Bollards, but no other facilities. Head 47 ft. wide for 135 ft. Parapet on outside.
Molo Nord (dog-legged)	6-26	440+ 1,670	—	Health office at head. Seaward side rough. Floating dock 400 ft. from root.
Molo Sud (dog-legged)	11-21	1,230 +480	? 2	Seaward side rough, except for a length near the root.
Capitaneria quay .	8	340	—	Port offices and customs shed at north end.
Banchina della Lupa .	7-10	295 +120 +130	? 2	South-west leg 320 ft. long but south-west 190 ft. taken up by customs-shed on quay side.
Banchina della Cala .	0-10	c. 1,100	? 2	Curved south-eastern 350 ft. juts out 40 ft.
Banchina di Piedigrotta	3-9	600	—	Shipyard at south-west end.
Molo Trapezoidale				
East quay . . .	2-5	990	—	Completely undeveloped.
North quay . . .	29	1,130	—	Divided by transverse wall.
Seaplane station quay .	29	400	? 1	Two hangars behind quay. Basin used by seaplanes.
Pontile Vittorio Veneto	..	..	..	Not yet properly surfaced.
South side . . .	29	1,030	—	..
Head	29	200	—	..
North side . . .	27	1,040	—	..
Banchina (name not known)	25½	430	—	Between roots of Pontile Vittorio Veneto and Pontile Piave. War- ships stern-to.
Pontile Piave				
South side . . .	26	1,020	—	..
Head	25	210	—	..
North side . . .	26	1,025	—	..
Banchina F. Crispi .	24-29	430	—	..
Pontile S. Lucia				
South side . . .	24-29	1,010	—	..
Head	21	120	—	..
North side . . .	6-20	1,020	—	Ships for Naples, Tunis, and Tripoli. Inner 200 ft. only 6 ft. alongside. Large customs shed called 'Stazione Marittima'.



PLATE 43. *Palermo: the cathedral and M. Pellegrino*

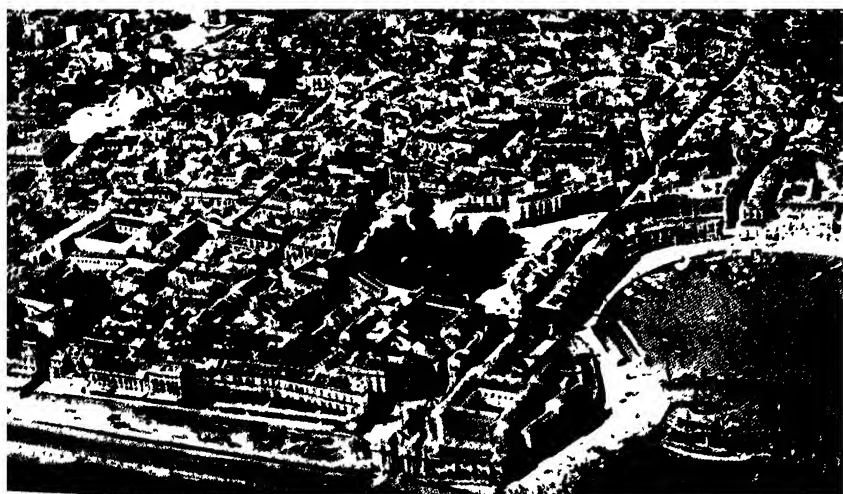


PLATE 44. *Palermo: the Cala and the old town*

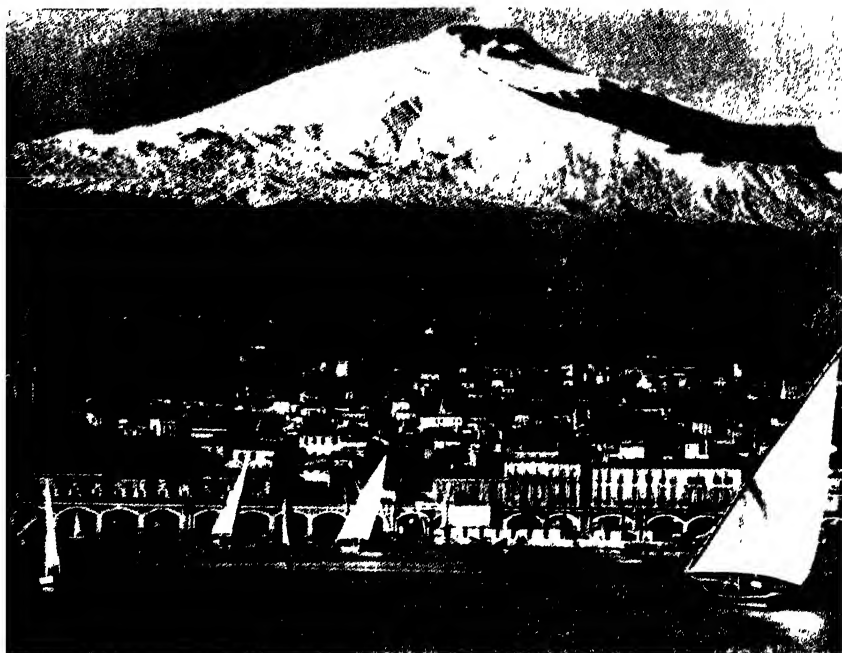


PLATE 45. *Catania and Etna*

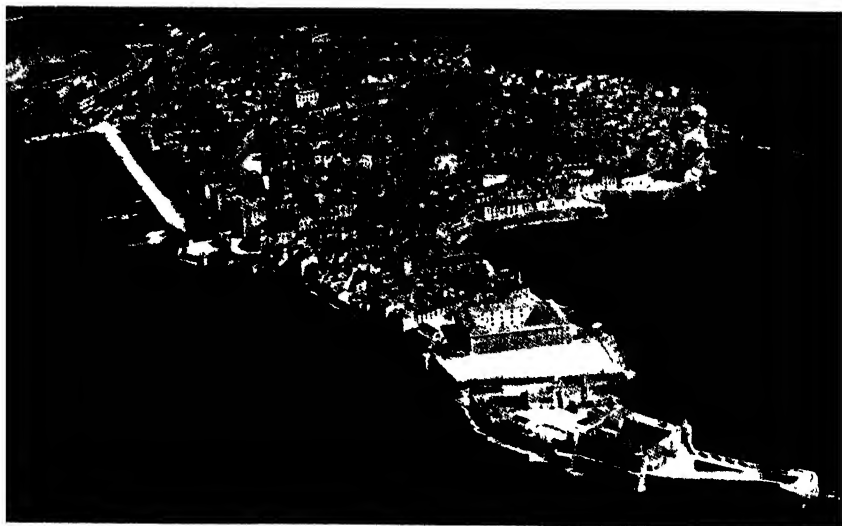


PLATE 46. *Syracuse: the island of Ortigia*

<i>Name</i>	<i>Depth alongside (feet)</i>	<i>Length (feet)</i>	<i>No. of cranes</i>	<i>Facilities, &c.</i>
Pontile Ferroviario				
South side . . .	5-20	700	—	Slipways south of root.
Head . . .	20	195	—	..
North side . . .	29½	330	—	Coal for railways.
Banchina del Puntone .	29½	730	? 1	Timber and building materials. Coal recently.
Banchina Quattroventi .	29½	790	—	Coal and oil. Customs-house behind. Three bunkering points.
New shipyard quay .	13-26	320	1	Projects in front of No. 17, and 110 ft. from west end of No. 19. Covered slip at west end. Ships refitting.
Banchina del Cantiere				
Navale . . .	..	..	—	Ships refitting.
West leg . . .	c. 10	195	—	..
Middle leg . . .	10-26	400	—	Broken by entrance to graving dock.
East leg . . .	c. 26	270	1	..

Facilities. The Captain of the Port's offices are at the root of the Molo Sud, and the Health office is at the head of the Molo Nord. The customs-house is behind the Banchina Quattroventi on the north shore of the harbour.

Warehouse accommodation is scanty, although it was intended to increase it with the development of the Molo Trapezoidale. At present the only storage space is in the buildings on and near the root of the Pontile S. Lucia, the most northerly of the three new jetties, in the customs sheds on the east quays of the Cala, and, possibly, in the customs-house. Most cranes are small, stationary, and hand-operated. There are possibly a dozen of these on the quays and in the sheds of the Cala, and 2 are located in the north of the harbour. The shipyard has 11 cranes of 2 to 3 tons capacity, of which 9 and possibly all are electric. A floating crane of 25 tons is part of the normal equipment.

Small stocks (4,000 to 5,000 tons before the war) of coal are maintained on the quays in the north-west. Of the three oil depots in Palermo (Appendix II) only one is in the port area, namely the two tanks belonging to Nafta on the Banchina Quattroventi, where there are also three bunkering points. The Molo Nord and Sud, the Banchine del Cantieri and della Cala, and the Pontile S. Lucia have water laid on, and supplies are abundant.

The Cantieri Navali Riuniti can execute repairs of all kinds to hulls and machinery: it has extensive shops round the root of the Molo Nord and of its five building slips two are capable of building ships

up to a length of 560 feet; it operates the floating dock moored near the north end of the Molo Nord, the external dimensions of which are approximately 250 feet by 59 feet; and it owns the dry dock, already referred to, which can be operated in three lengths.

Dimensions of Graving-dock

Length (to floor head)	. . .	568 ft. 6 in.
Width (maximum floor width)	. . .	77 ft. 2 in.
Depth on sill	. . .	28 ft. 7 in.

There are, in addition, repair shops with the three slips at the head of the basin south of the Pontile Ferroviario, and with the slips on the north-west of the Cala. The greatest width of any of these slips is 90 feet and the maximum size of ship that can be handled is 50 tons.

Only the Pontile Ferroviario and the two quays to its north are served by rail. The lines unite at the root of the jetty and connect by a single track through the middle of the town to the main station about 1 mile south of the Cala.

All quays north of the Molo Trapezoidale have access, through gates in the enclosing wall, to the wide road skirting the north and west of the harbour. The quays of the Cala are open, but the roads behind are narrow; the best exit is eastwards to the Foro Umberto I.

Trade and Connexions... Palermo is the principal port of Sicily, and, although in peace-time it was almost exclusively a commercial and passenger port, during the War of 1939-1945 it has been developed as a naval base.

Statistics of shipping and of the passenger traffic are as follows:

	1938	1939
Ships entered: number	4,348	3,146
tonnage	3,847,000	3,191,000
Ships cleared: number	4,343	3,148
tonnage	3,835,000	3,201,000
Goods landed: tons	564,000	483,000
loaded: tons	153,000	171,000
Passengers disembarked	129,446	94,573
embarked	128,764	97,870

The chief imports are coal, mineral oil, phosphates, timber, metal ores, cereals, and cattle. The chief exports are fruit and fruit products, vegetables, fish, and sulphur.

There are sailings daily to Naples, four times a week to Ustica, weekly to Trapani and Genoa, and fortnightly to Pantellaria and Tripoli. Palermo is a port of call on the following Italian services: weekly, Naples to Tunis, Naples to Tripoli, Fiume coastwise to



FIG. 36. Milazzo

Genoa and Valencia, Genoa to Sicily, giving connexion to other Sicilian ports, and Genoa to Tripoli; four times a month, Genoa to Sicily with connexion to other Sicilian ports; fortnightly, Fiume coastwise to Genoa, Trieste to the gulf of Mexico, Trieste to north Africa, Trieste to Genoa, with connexion to Morocco, and Genoa to the Black Sea (outward only); every three weeks, Genoa to Montreal (outward-bound only); and monthly, Genoa to Singapore and Saigon (outward only), and Genoa to New York.

Inland Communications

Railways. From the Stazione Centrale, single-track lines go to (1) Messina, (2) Catania, branching from the Messina line at Termine Imerese, and (3) Trapani via Alcamo, where a line diverges for Marsala. From the Stazione S. Erasmo there is a narrow-gauge railway to Corleone and S. Carlo.

Electric tramways traverse the principal streets and run to the following places outside the city: Acquasanta, S. Lorenzo, Sferracavallo, Mondello, Monreale, La Zisa, Porrazzi, and S. Giovanni dei Leprosi.

Roads. Palermo is on road 113 which follows the north coast from Trapani to Messina. Road 121 goes from Palermo via Enna to Catania, and road 118 branches from it at Bolognetta for Agrigento. Other main roads lead to Piano dei Greci, Monreale, and Partinico.

Airways. From the Aereoporto Bocca di Falco ($2\frac{1}{2}$ miles west of the city) air services operated to Naples, Rome, Catania, Malta, and Tunis. The seaplane station lies between the Pontile Vittorio Veneto and the Molo Trapezoidale.

MILAZZO. Latitude $38^{\circ} 13' N$. Longitude $15^{\circ} 14\frac{1}{2}' E$. Population 10,378.

Position and Site (Fig. 36; Plate 41)

The peninsula of Milazzo, about 24 miles west of Cape Peloro, is separated from the mountains of northern Sicily by a coastal plain, which is so low by contrast that the peninsula has the appearance of an island when viewed from any distance to east or west. The olive-clad peninsula rises steeply to a flat top at a height of about 300 feet, with a further rise at one place to 440 feet, and is about 4 miles long and less than 1 mile wide. The coastal plain at the root of the peninsula rises gradually inland from a height of 20 feet to 150 feet in about 3 miles.

The town is dominated by the Castello, near the southern end of the flat top of the peninsula, with the old part of the town on the steep slopes below. The streets here are mostly steep and narrow. The newer part stretches south to the harbour along the eastern and central parts of the low flat neck of the peninsula. The main industrial area is situated between the harbour and the railway station, south-east of the low narrow neck of the peninsula. Tunny-fishing establishments are to be found near the coast both east and west of the base of the peninsula, and near the tip of Cape Milazzo.

History

Milazzo was the ancient Mylae, founded in 716 B.C. by Greeks from Zancle (Messina), of which city it was for some time a dependency. Both in medieval and modern times it had its full share of the vicissitudes of Sicilian history. Its individual importance rests chiefly on two battles. In 260 B.C., during the First Punic War, the consul Gaius Duilius won a great naval victory over the Carthaginians off Milazzo. For this achievement, which opened the way to Roman control over the Mediterranean, he was rewarded with a triumph in Rome and a column was erected in his honour. On 20 July 1860 Garibaldi assaulted the Bourbon forces under General Bosco, shut up in the Castello of Milazzo, and forced them to surrender. The victory crowned the success of his Sicilian expedition.

Public Buildings and Monuments

The only monument of historical and artistic interest is the Castello, which towers above the old part of the city. The thirteenth-century keep with a fine doorway is well preserved, but the greater part of the fortification dates from the time of Charles V and is markedly Spanish in character.

Industry

The main industries of Milazzo, which is in a fertile agricultural district, are concerned with the processing of local products, especially olives and tunny fish. There are several olive presses, including a somewhat larger one than usual belonging to the S.A. Bonocorsi e Lucifero, which, in addition to olive oil, produces sulphur oil from olive residue, tartar derivatives, and chemical fertilizers. The Montecatini chemical works also make chemical fertilizers and possibly carbon disulphide and sulphuric acid. Tunny is canned near and in

the town. The red wine of the district, known as milazzo, is locally important and is very heady. There are also flour mills and pasta factories.

Description of Port

The port of Milazzo is situated on the east shore of the root of the Milazzo peninsula at the head of the gulf of Milazzo. It is open on the east, but protected on the north-east by the Molo Foraneo and Molo Ludovico Marullo. The Molo Foraneo, which has depths alongside of 8 feet, extends 330 feet eastwards of the head of the Molo Ludovico Marullo. This latter quay, which has a length of 1,100 feet and depths alongside of 13 feet, extends north-west to the root of the peninsula, and on its north side is contiguous with the Marina Garibaldi, a wide street extending for about 600 yards along the east shore of the peninsula. Its water-front is walled and forms a boat-landing place in spite of its lack of protection. Within the harbour proper the rest of the quays line the shore of the peninsula where it curves to the south-east. Immediately west of the root of the Molo Ludovico Marullo is the Banchina Luigi Rizzo, which extends south-west for about 600 feet and has depths alongside of 6 feet. This quay is continued south-south-east by the Banchina di Sud-Ovest, which has a length of about 700 feet and depths of 6 feet alongside. Much of the shore between this quay and the South Breakwater, which encloses the harbour on the south-east, is occupied by the seaplane station. The south breakwater is faced with rough blocks and is about 600 feet long. The opening between it and the head of the Molo Foraneo is about 400 yards wide. Depths in the entrance are over 18 feet for 270 yards to the south of the Molo Foraneo, with a general depth of 33 feet in the fairway. The bottom inside the harbour is mud over sand and gravel and affords only fair holding ground.

Facilities. The Port offices are at the junction of the Molo Foraneo and the Molo Ludovico Marullo. Warehouses line the north-western half of the Molo Ludovico Marullo, and industrial establishments the south-west part of the harbour. Ships alongside can discharge directly on to the quays by using their own appliances, there being only one hand-crane on the Molo Ludovico Marullo.

Small supplies of coal are normally maintained, but there is no bulk storage of oil. Water is laid on to the quays, but the supply is frequently scarce in summer. Minor repairs can be carried out by several small boat-yards.

Trade and Connexions. Milazzo, although only a small port, is the main outlet of a large agricultural district, and is also the terminus of the service to the Eolian islands. During the winter it is much used as a port of refuge for small coastal sailing craft. The chief imports are cereals and timber, and the principal exports wine, citrus fruits, and vegetables. In 1937 and 1938 respectively 55,684 tons and 60,308 tons were discharged and 23,259 and 14,646 tons cleared.

Inland Communications

Railway. Milazzo station is on the single-track line along the north coast from Palermo to Messina.

Roads. A main road leads from the town of Milazzo to Olivarella on the main north coast road (113) from Trapani and Palermo to Messina.

MESSINA. Latitude $38^{\circ} 11\frac{1}{2}'$ N. Longitude $15^{\circ} 34'$ E. Population 121,605. Provincial capital. Seat of archbishopric. University. Chamber of Commerce.

Position and Site (Fig. 37)

Messina is in a sheltered position on the western shore of the narrow straits of Messina, about 8 miles from Cape Peloro, the north-eastern tip of Sicily. The coast between this cape and Messina harbour is shaped in a wide curve facing south-east, but to the south-west the coast is remarkably straight for many miles. The harbour is protected by the sickle-shaped promontory of Braccio di S. Raineri, where the form of the coast changes. Throughout the coast is backed by the Mi. Peloritani, which are more than 2,000 feet high only 3 miles inland. The lower slopes are planted mainly with vineyards and citrus trees, but the higher slopes are covered with macchia or with pine forest. A number of stream-beds descend south-east from the mountains to the coast, and several which pass through the built-up area are canalized and partly roofed over.

The nucleus of the city is to the west and south of the harbour, with the Cittadella at the root of Braccio di S. Raineri. The city, however, now extends along the coast for about $2\frac{1}{2}$ miles, and inland for about 1 to $1\frac{1}{2}$ miles up the valleys, but narrows to about $\frac{3}{4}$ mile at the spurs between them. Near the coast the built-up area, especially south-west of the harbour, is on a flat plain of sand and gravel, which continues for about $2\frac{1}{2}$ miles along the coast beyond the city limit;

inland the suburbs rise to various heights up to about 350 feet on the spurs and only slightly higher up the river valleys.

The city's centre is the Piazza del Duomo, west of the harbour, and the cathedral, town hall, and General Post Office are concentrated here. The university, law courts, and important banks are a few streets away to the south, and the government and finance offices a similar distance to the north. The higher-class residential quarter, known as the Citta Nuova, is south-west of the harbour and the main railway stations, and contains most of the best hotels. The working-class housing schemes include large blocks of flats both at the northern and southern ends of the city, and estates with small houses in a number of suburbs, including Bisconti, 1 mile west-south-west, and Ritiro, nearly 2 miles north-west of the Piazza del Duomo. Much reconstruction has been done since the earthquake of 1908, although some of the hutments put up for temporary shelter after that disaster, such as those near Ritiro, were still in use in recent years. Strict regulations have been enforced in rebuilding so as to minimize danger in future earthquakes.

History

Greeks from Cumae and Chalcis founded a colony at Messina in the eighth century B.C., naming it Zancle in allusion to the sickle-shaped peninsula enclosing the harbour. In 439 B.C. it was taken by Anaxilis, tyrant of Reggio, who renamed it Messina after his own native city in the Peloponnesus. Destroyed by the Carthaginians under Himilco, it was rebuilt by Dionysius I of Syracuse. In 288 B.C. the Mamertines, discharged mercenaries of Agathocles, took possession of the city, and when threatened by Hannibal sought the aid of the Romans, thus bringing about the First Punic War. Messina was invested by Syracusans and Carthaginians, when in 264 the siege was raised by Appius Claudius, and from that time forward it was a Roman city. Pompey made it the headquarters of his fleet during his war with Augustus, and after its conquest by the latter in 36 B.C. it became a place of considerable importance. During the Middle Ages it was a free city and its prosperity was greatly increased by the Crusades. Richard I of England and Philip Augustus of France spent the winter of 1190-1191 here on their way to Palestine. In 1282 Messina put up a protracted and successful resistance to the besieging armies of Charles of Anjou. Among the Spanish rulers of Sicily, Charles V showed special favour to Messina, and his son Don John of Austria was received here on his return from his victory over the

Turks at Lepanto (1571). Rivalry between the aristocratic and democratic elements in the city and discontent at Spanish misrule led in 1674 to an invitation to Louis XIV of France, who sent an army and fleet to occupy Messina, only to withdraw them in 1678, leaving the city at the mercy of the Spaniards, who deprived it of all its privileges. In 1847 it rose against the Bourbon Government, and from 3-7 September 1848 suffered a merciless bombardment at the orders of King Ferdinand II, which earned for him the nickname of Bomba. The most fateful event in the history of Messina is the great earthquake of 1908. It had suffered severely from earthquakes in 1783 and 1894, but these were not comparable to the appalling catastrophe of 1908 in which some 84,000 people lost their lives and the city was reduced to ruins (I, p. 480). Messina has only slowly recovered from its misfortunes, and when Mussolini visited the city in 1924 he was horror-struck at the sight of 'the shameful hovels in which the survivors of the earthquake are still crowded after fifteen years'.

Public Buildings and Monuments

The principal public buildings of Messina are almost all of twentieth-century construction owing to the ravages of the earthquake of 1908. They are, for the most part, grouped round the Piazza del Duomo, in the centre of which is the Orion fountain by Montorsoli (1547); this suffered only partial injury in the earthquake. The cathedral by Francesco Valenti is a copy of the old building, dating back to the Norman period. It and the new campanile are the most noticeable features in the city. The apses of the interior preserve their thirteenth-century mosaics, but the antique granite columns were smashed to pieces and have been replaced by concrete shafts. The church of the Annunziata dei Catalani, a Norman church of the twelfth century, with a thirteenth-century façade, suffered comparatively little damage, and has been carefully restored. Near it is a bronze statue of Don John of Austria (1572). Another medieval relic is the church of Sta. Maria Alemanna, once belonging to the Teutonic Order. Among handsome modern buildings are the new university, its various departments ranged round a central court, the Palazzo di Giustizia (1928), the Palazzo Provinciale, and the Palazzo Municipale. The Teatro Vittorio Emanuele (1852) was scarcely touched by the earthquake. The Museo Nazionale contains works of art salvaged from the earthquake, including an admirable triptych by Antonello da Messina (1430-1479), the city's most distinguished painter.

Industry

Messina is an important centre for processing the fruits, particularly the citrus fruits, of the important surrounding fruit-growing region. There are several large firms making fruit juices, citric acid, and calcium citrate, whilst others make liquorice or liquorice paste, and prepare peel for candying or packing in brine. The Kia-Ora company have a factory near by at Nizza. Various other foodstuffs are prepared or salted. Other industrial concerns include olive-oil presses, flour-mills, pasta factories, a brewery, soap-works, and a small engineering works.

Description of Port

Messina has a deep natural harbour that is roughly circular, and well sheltered by the sickle-shaped peninsula of Braccio di S. Raineri. The port is best known as the Sicilian terminus of the train ferries to southern Italy, but it is also of considerable importance as the second commercial port of Sicily and as a naval base.

There is exposed anchorage on good holding ground north of the harbour, north-east and south-east of the mouth of the F. Giostra, but ships are not allowed normally to anchor in the harbour. The approaches are deep and unobstructed, and the entrance facing north is 825 feet wide between the 5-fathom line. General depths in the harbour are more than 120 feet, and only close to the northern and western shores and in the south-eastern quarter are there depths of less than 30 feet.

The western and southern shores are quayed irregularly from a point opposite Forte S. Salvatore, on the end of Braccio di S. Raineri, to the four train-ferry berths in the south. The Stazione Marittima lies to their east, and to its north-east two large moles, the Pontili Etiopia and Libia, have been built, although neither is as yet fully developed. The area between them is reserved for seaplanes, and to the east of the Pontile Libia a deep-water basin, the Darsena di Levante, is under construction. The north-east of the harbour, with a floating and a dry dock, naval barracks, submarine berths, and a destroyer quay, is reserved for the navy.

The majority of the quays are 10 feet high, but those north of the market on the west of the harbour are from 2 to 6 feet and some of the naval piers probably only from 3 to 6 feet in height. Berthing is normally stern-to, for except on the west side of the Pontile Libia no vessel longer than 450 feet can come alongside without overlapping.

Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
Commercial Harbour				
Capitaneria quay.	c. 6	c. 700	—	Small landing jetty in front of Port offices.
Banchina dei Vespri	3-16	c. 650	—	Slightly dog-legged—550+70+30 ft.
Banchina del Littorio	c. 13	450	—	..
Pontile Colapesce	c. 6-18	510	—	Dog-legged, convex: south end of north part projects in front of south part. Large covered market on south part.
Banchina XXVIII Ottobre	c. 18-26	350	—	..
Banchina 1 Settembre	22-26	330	—	..
Banchina Marconi	22-29	350	—	..
Banchina della Peloritana	34-49	400	2	Customs-house behind.
Banchina Luigi Rizzo	26-49	375	—	..
Banchina Lepanto	8-26	440	—	Set back from Banchina Luigi Rizzo. Oil.
Train-ferry jetties (numbered west to east):				
No. 1	28	190	—	Wedge-shaped berths between jetties: ferry held tight when bows are close up to link span.
No. 2	27	450	—	
No. 3	18	140	—	
No. 4	22	140	—	
No. 5	21	140	—	
Calata Navi Traghetto	..	510	—	Depths of 12 ft. at 20 ft. off. Lie-to for ferries not in use. Stazione Marittima behind.
Pontile Etiopia	..	..	—	Not fully developed.
West quay	23-24	550	1	..
Head	27	340	—	..
East quay	25-26	430	1	..
Calata Egeo	23-24	560	2	Coal dump.
Naval Establishment				
S. Salvatore (slightly dog-legged)	..	..	—	Comprises NE. part of port.
West leg	c. 17	320	—	Recently constructed. Usually used for mooring harbour craft stern-to. Small jetty about 20 ft. long projects from east end.
East leg	10	110	—	Two jetties, each about 20 ft. long, project from this leg.
Destroyer Quay	c. 13 alongside	590	—	Normally used by destroyers mooring stern-on to western half; depth is sufficient for sterns to be hauled close to quay.
Oil-tank jetty	28 at head; c. 10 at root	80	—	Oil tanks close to root.
Admiralty wharf	c. 10	160	—	Skeleton wharf, connected to shore by three narrow piers, each about 25 ft. long.
Submarine T-pier	25	180 (head)	—	Submarines moor stern-on to SW. of head; small craft moor inside head. Pier connecting with shore is 96 ft. long.

<i>Name</i>	<i>Depth alongside (feet)</i>	<i>Length (feet)</i>	<i>No. of cranes</i>	<i>Facilities, &c.</i>
Submarine L-pier .	? alongside; 23 at 30 ft. off	140 (head)	—	Similar type to above, but connecting pier, 125 ft. long, connects at west end instead of middle.
Short jetties SE. of L-pier . . .				
Northern jetty . .	7 at head	55	—	..
Southern jetty . .	2 at head	20	—	..
Jetty extending west close north of dry dock	19 at head	80	—	..
Short quay north of dry dock	19	35	—	Craft moor stern-to.
Short quay immediately south of dry dock	c. 29	30	1	Ships refitting moor stern-to. Crane serves dry dock.
Quay connecting above with Pontile Libia .	c. 20	c. 130	—	Gangway to floating dock leads from this quay.
Pontile Libia . . .	..	..	—	Large rectangular mole. Coal dumps on mole.
North quay . . .	c. 30	340	—	Floating dock moored north of and 40 ft. from quay.
West quay . . .	25 (30 at north end)	630	—	..
South quay . . .	21 to 24	420	—	..
East quay . . .	c. 6	375	—	Was planned to be west quay of new basin, Darsena del Levante.

Facilities. The office of the Captain of the Port is on the west side of the entrance, in the centre of the Capitaneria quay. The customs-house is behind the Banchina della Peloritana in the south of the harbour.

In the commercial harbour there are but 7 cranes, of which 3 are on the Pontile Etiopia, 2 in front of the customs-house, 1 a transporter on the Calata Egeo, and 1 at the dry dock. Most are of 3 tons capacity, but the last can take a load of 8 tons. The floating equipment includes 1 large and 1 small crane, and 1 medium sheer-legs. The only warehouses are in the south of the harbour at the customs-house and to its east.

Supplies of coal are kept on the Pontile Libia and on the Calata Egeo. The transporter crane makes bunkering easier on the latter. Oil depots are 4 in number (Appendix II), the tanks south-east of the customs-house being mainly for the train-ferries. Most quays have hydrants and are lit by electricity.

The naval dockyard is able to execute large repairs to hulls and machinery. The slipway to the north of the dry dock is about 30 feet wide, and the floating dock, which was constructed in 1940 and is

able to take large destroyers, is approximately 385 feet long and 58 feet wide overall. The dimensions of the dry dock are as follows:

Length: floor, $342\frac{3}{4}$ ft.; coping, $347\frac{1}{2}$ ft.

Width of entrance: sill, $52\frac{1}{2}$ ft.; coping, $71\frac{1}{4}$ ft.

Depth: sill, 27 ft.; blocks, $23\frac{1}{4}$ ft. aft, $21\frac{1}{4}$ ft. forward.

Ships 342 ft. long with rudder unshipped can be taken.

Outside the harbour immediately north of the gas-works on the north bank of the F. Giostra, the Cantieri Navale Peloritano has 4 patent slips capable of handling craft up to 164 feet long and 400 tons displacement. The yard can undertake repairs to small craft.

From the marshalling yards south of the train-ferry berths lines serve the Calata Egeo, the Pontile Etiopia, and the southern quays westwards to the Banchina della Peloritana. The quays on the south and west of the harbour have access to the Via Garibaldi through gates in the wall behind them. The road that serves the east of the harbour passes west of the Citadella and east of the marshalling yards, and then with a right-angled bend crosses the yards by a bridge immediately south of the main station.

The passenger traffic with southern Italy is normally the major activity of the port. The ferries run five times daily in each direction to Reggio di Calabria and eight times to Villa S. Giovanni. Passengers disembarked and embarked were respectively 2,565 and 2,045 in 1938, and 5,388 and 6,115 in 1939.

There are considerable imports of coal, oil, cereals, timber, and fish, and exports of sulphur, calcium citrate, wine, fruit, and vegetable oils. Shipping statistics are as follows:

	1938	1939
Ships entered: number . . .	3,228	3,441
tonnage . . .	2,064,000	1,928,000
cleared: number . . .	3,234	3,441
tonnage . . .	2,067,000	1,931,000
Goods landed: tons . . .	299,000	308,000
loaded: tons . . .	103,000	83,000

There are services twice weekly from Messina to the Lipari islands and weekly via the Lipari islands to Naples. The town is also a port of call on many of the services from Genoa, Naples, and the northern Adriatic ports: weekly, from Fiume coastwise to Genoa and Valencia; Genoa to Tripoli; and Genoa to Sicily (two services) giving connexion with other Sicilian ports; Genoa outward bound to the Black Sea: every ten days, Genoa coastwise to Venice (outward only): fortnightly, Naples to Tripoli; Genoa to Palestine, Syria,



FIG. 38. Catania

Cyprus, and Crete (outward only); Genoa to Chisimayu; Fiume coastwise to Sardinia and Genoa; Trieste to Genoa and Marseilles; Trieste to North Africa; and Trieste to the Gulf of Mexico: twice a month, Genoa to north-west Europe: every three weeks, Genoa to Montreal (outward only): monthly, Genoa to Djibouti (outward only); Genoa to New York; Naples to Benghazi; and the two services, outward bound, which circumnavigate Africa from Trieste: and 6 times a year from Genoa to Australia (outward only). The majority of the services from Genoa call at Naples, and many of them also at Leghorn and La Spezia.

Inland Communications

Railways. Single-track lines from Messina Marittima run through the Central Station to Catania and Syracuse and to Palermo. There are train ferries between Messina Marittima and Reggio di Calabria and Villa S. Giovanni. Electric trams traverse the city and run to Faro and Giampileri.

Roads. Messina is the starting point of road 113 to Palermo, and of road 114 to Syracuse. A main road past Cape Peloro joins road 113 near Divieto on the north coast.

CATANIA. Latitude $37^{\circ} 30' N$. Longitude $15^{\circ} 6' E$. Population 241,462. Provincial capital. Seat of archbishopric. University. Chamber of Commerce. British Vice-Consul.

Position and Site (Fig. 38; Plate 45)

Catania, on the east coast of Sicily, is built on the lower south-eastern slopes of Etna where they adjoin the plain of Catania. This is the largest lowland on the island and extends for 8 miles south of the city and for 20 miles inland. Immediately north of Catania the lower slopes of the volcano rise gradually and evenly, though a short distance to the west a small group of outlying hills rise steeply from the flat plain to heights of 800–1,000 feet. The coast north-east of Catania consists of low, indented lava cliffs, whilst the straight coast of the plain to the south is fringed by a beach and sand-dunes. The slopes of M. Etna are very fertile and intensively cultivated with citrus and olive groves and vineyards except on some of the more recent or less fertile lava-flows. The plain of Catania is, in contrast, covered with marsh and with damp treeless pasture, though the better drained parts near the city are planted with vineyards and citrus groves.

The greater part of Catania is built on the irregular surface of lava-flows of various dates. The district north of the harbour is on ground 20–30 feet high at the coast and rises to 150 feet in the north and western fringes of the city, whilst some of the suburbs 2 miles from the coast have an altitude of 300 feet. The southern districts are on flatter and lower ground, rising to 90 feet in the west. Because of the lava-flows, abrupt differences in level, irregular patches of unreclaimed lava surface, and occasional small deep pits are found in the city.

Catania has an irregular and sprawling shape, and no main piazza. The city is in two parts, one being south of the Via Garibaldi and on the west side of the harbour, and the other to the north of the road and the harbour. The southern part consists of working-class residential quarters and industrial buildings. Most of its streets are narrow and tend to converge on the wider Via Plebiscito. The main business district is in the northern section, north-west of the harbour. The roads here are for the most part somewhat wider and intersect each other at right angles. The principal business streets are the Via Etna running from north to south, the Via Vittorio Emanuele, and the Via Antonino di Sangiuliano running east and west. The better residential districts are north and west of the business quarters, whilst in the north-eastern area as far as the suburb of Guardia are industrial establishments and working-class quarters.

History

The Greek city of Catania was founded by Chalcidian colonists in 729 B.C. It retained its freedom until 476 B.C., and became noted as a centre of culture. Here about 640 B.C. Charandos drew up a code of laws which was adopted throughout Sicily and Magna Graecia; in the sixth century B.C. the poet Stesichorus and the philosopher Xenophanes were among its citizens. In 476 B.C. Hiero I of Syracuse took Catania and drove out its inhabitants, but the exiles returned in 461 and expelled Hiero's colonists. During the war between Athens and Sparta, Catania became the base of Athenian operations. In 403 it was taken by Dionysius I of Syracuse, its citizens being sold as slaves, and in 396 it was occupied by Himilco. Timoleon of Syracuse freed Catania from the Carthaginian yoke in 339, and it was one of the first cities of Sicily to fall to Rome (263 B.C.). It reached its greatest prosperity during the Augustan age when the city was rebuilt after the ravages caused both by war and an eruption of Etna in 121 B.C. Belisarius took Catania from the Goths in A.D. 535, and it remained

subject to Byzantium until it was seized and plundered by the Saracens in 902. In the twelfth century it suffered from a severe earthquake (1169) and from the punishment inflicted on it by the Emperor Henry VI for having espoused the cause of Tancred (1194). Frederick II also sacked the city and built a castle there to hold down his rebellious subjects (1232). It was favoured by the Aragonese kings, especially by Alfonso I, who in 1445 founded a university there, which was revived in the seventeenth century after it had been allowed to lapse. An eruption of Etna in 1669 and an earthquake which killed two-thirds of the inhabitants in 1693 reduced the city to ruins, but it was rebuilt according to a plan designed by Lanza, Duke of Camastra, the Spanish Lieutenant of Sicily. Thus it is to-day mainly an eighteenth-century city.

Public Buildings and Monuments

The most striking monument in Catania is the cathedral of Sta. Agata, the patron saint of the city who was martyred under Decius in 252. Begun by Count Roger in 1091, it was badly damaged by the earthquakes of 1169 and 1693, and only the apses remain of the Norman building. The façade by Vaccarini dates from 1736, the granite columns which support it having been taken from the ancient theatre. In the chapel of Sta. Agata are the relics of the saint in a silver reliquary of the fourteenth century surmounted by a crown said to have been presented by Richard I of England. Two sarcophagi in the choir contain the remains of Aragonese kings of the fourteenth century. In the Piazza del Duomo is the Fontana dell'Elephante; the antique lava elephant supporting an Egyptian obelisk, known locally as Diotriu, figures in the city's arms, and the fountain was constructed by Vaccarini. Of ancient remains the most important is the theatre, a Roman structure erected on late Greek foundations; the building is of lava, practically all the marble facing having disappeared. Part of the amphitheatre, a restoration of an earlier building made by the sons of Constantine, has been uncovered, but the rest lies buried beneath Piazza Stesicoro. The Castello Ursino with its four massive towers was first built by Frederick II, but was badly damaged by the eruption of 1669, when the lava filled up its rampart-ditch. It has been in turn a fortress, a palace, a parliament house, and a barracks, and is being restored as a museum. The great baroque church of S. Nicolò is the largest in Sicily. Part of the suppressed Benedictine monastery to which the church was attached houses the Museo Civico, containing miscellaneous antiquities and

some good pictures. The Palazzo dell'Università dates from 1684, and possesses important volcanological collections. Villa Bellini is an attractive public garden, named in honour of Vincenzo Bellini (1801-1835) the composer, and containing his bust together with those of other natives of Catania, as well as of the heroes of the Risorgimento.

Industry

Catania, in a very fertile agricultural district, has a wide range of food-processing industries as well as sulphur refineries and engineering works. There are numerous olive-oil presses in and near the city, the largest being owned by the Società Oliera Etna and the Società L'Insulare. Both these firms also make sulphur-oil, whilst the latter manufactures carbon disulphate. Soap-making is an important by-product of the olive-oil industry, orange and lemon peel are candied, and essence extracted for perfumes, whilst the important S.A. Derivati Agrumari at Tremestieri, north of the city, make lemon and orange juices, calcium citrate, and citric acid. Tomatoes are canned as purée, or bottled as extract or paste. Several establishments make liquorice and liquorice pastes, glycerine, wine, brandy, liqueurs, tartar (from wine lees), and tartaric acid. There are also the flour mills and pasta factories so essential to a Sicilian city. Fish, particularly tunny, is dried or salted, whilst coral fishing is also important locally. Catania is one of the principal Sicilian ports for the export of sulphur and has several refineries in the north-eastern part of the city. The railway rolling-stock maintenance depot is the most notable engineering establishment, though there are several foundries and works making iron bedsteads. Other industrial plants include a Montecatini chemical factory making superphosphates, tanneries, works for the manufacture of leather goods, musical instruments, and cement, as well as a bitumen emulsion (for road making) plant.

Description of Port

The harbour of Catania is entirely artificial. Rectangular in shape, it is protected on the east by the Molo di Levante, a narrow mole about $1\frac{1}{4}$ miles long from north to south, and on the south by the broad Molo di Mezzogiorno which projects eastwards from the shore. The basin so formed is divided in two by the Sporgente Centrale, a mole extending southwards from the north shore. The harbour faces south and its approaches are free of danger. The outer anchorage is south of the entrance and is untenable with a strong east wind. Entry

is difficult with strong south-east winds, which send a considerable sea into the harbour.

The Molo di Levante has been built in four sections, the outside rough below a parapet, the inside quayed. At the south end of the second, longest section a triangular bastion represents an earlier head. The entrance to the harbour, 780 feet wide with depths of 36 to 50 feet in the fairway, is between this and the jetty projecting from the south-east corner of the Molo di Mezzogiorno. Most of the harbour has depths of more than 30 feet. The south-west part is used by seaplanes, and along the west shore north of the root of the Molo di Mezzogiorno there is a small basin, the Porto Peschereccio. The boat repair yard on its western shore has two slips; a breakwater, which was recently built from north to south on the east, now gives the basin protection, but narrows the entrance to less than 75 feet. To its north the Bacino di Ponente is the western of the two basins in the northern half of the harbour. Approximately 550 feet separate the Banchina F. Crispi on the west and the Sporgente Centrale on the east, but the northern part is widened by the Porto Vecchio on the east side. The customs quay is at the head, and at its west end an old basin is under reclamation, having been blocked off so that the western and northern quays are now contiguous. The eastern basin, the Porto Nuovo or Bacino di Levante, is roughly rectangular, with an entrance 870 feet wide. Approximately in the centre two opposing jetties project about 190 feet from either side, thereby causing a bottle-neck 675 feet wide. There is a large rock with only 7 feet of water over it 750 feet south of the eastern spur, and between it and the spur there is shoal water.

All quays are 10 feet high, except on the Molo di Levante, where the central leg, south of the eastern spur, is only 7 feet high, and the southerly extension is 13 feet high. Ships berth alongside, but at certain quays, notably the south-west side of the Sporgente Centrale, catamarans are needed for ships of deep draught.

Facilities. All the offices are round the Bacino di Ponente. The health and pilots' offices are at the 'elbow' of the Sporgente Centrale, while the customs-house and the Port offices are on the customs quay.

The only large warehouse is the customs-house. The small buildings immediately to its east may be used for storage purposes. Information as to the number of cranes is uncertain, but there is one floating sheer-legs of 40 tons capacity.

Neither coal nor oil are held in any quantity. Stocks of coal are kept on the north and north-west quays in the Porto Nuovo and are

sometimes stored on both sides of the Sporgente Centrale. There are three oil depots: near the root of the Molo di Levante, about $1\frac{1}{2}$ miles west-south-west of the Molo di Mezzogiorno, and south of Acquicella station (Appendix II). Water is laid on to the quays in the north-west of the Porto Nuovo and in the Porto Vecchio. A water-boat of 40 tons capacity is normally available.

The only facilities are in the Porto Peschereccio, where small repairs can be executed. The two slips (probably only of gravel) are respectively 150 feet and 200 feet wide. The firm of Biscari has a boiler- and engine-shop in the town.

No.	Name	Depth alongside (feet)	Length (feet)	Facilities, &c.
	Molo di Mezzogiorno	24-26	1,140	South side extended by jetty c. 260 ft. long. Short spur at north-east corner. Parapet along south side. ? unfinished.
	Quay north from root of Molo di Mezzogiorno	15	270	..
	Jetty at north end of this quay	12-16	170	South breakwater of Porto Peschereccio.
1	Porto Peschereccio			
	North quay . . .	10-16	230	..
	Breakwater . . .	16-33	560	Fishing-craft berth on west side.
2	Banchina F. Crispi			
	South leg . . .	25 $\frac{1}{2}$ -33	570	..
	North leg . . .	14 $\frac{1}{2}$ -28 $\frac{1}{2}$	1,350	..
3	Customs quay . . .	c. 12	1,000	Port offices midway. Customs-house behind east end.
4	Porto Vecchio:			
	North quay . . .	11	390	Rectangular projection at junction with customs quay.
	South quay . . .	c. 10	370	Health office on a spur at south end. Pilot's office close north-east.
5	Sporgente Centrale:			
	West side . . .	20-23	970	Catamarans needed for deep vessels.
	Head . . .	24	400	..
	East side . . .	..	..	Dog-legged.
	South part . . .	16-27	550	..
	North part . . .	> 16	570	..
6	Porto Nuovo:			
	West spur . . .	20-25	190	..
	South-west quay . . .	> 16	460	..
	North-west quay . . .	> 16	460	Coal.
	North quay . . .	> 16	510	Coal.
	North-east quay . . .	30	560	..
	South-east quay . . .	22	375	..
	East spur . . .	22	195	Shoal at root of south side.
7	Molo di Levante:			
	Main leg . . .	10	2,150	Northern 500 ft. shoal.
	Bastion quay . . .	6-13	c. 470	..
	South extension . . .	c. 50	1,080	..
			+ 540	

The main line following the coast from Messina to Syracuse skirts the north of the harbour on a viaduct, and spurs rise northwards to join this line from the Sporgente Centrale, which is the only quay served by standard-gauge rail. The harbour station, north-west of the head of the Porto Nuovo, is the terminus of the narrow-gauge Circumetna railway, and from it sidings serve the south-west quay of that basin.

In contrast, all quays are well served by road. Those in the north-east are open to the town, under the arches of the viaduct. Those on the west of the harbour are enclosed by a wall, behind which runs the main road leading south-west. The Banchina F. Crispi is cleared through a gate at its south-west corner, although there is another exit at its north end. There is also a gate at the root of the Molo di Mezzogiorno opening on to the same road.

Trade and Connexions. Before the War of 1940-1945 a large fishing industry was centred on Catania, but the chief commercial activity of the port is the export of sulphur and the import of coal. The total by weight of the latter was in 1938 three times that of all other imports, the most important of which were phosphates, cereals, timber, and artificial manures. The other chief exports are normally vegetables, citrus fruits, and lava rock.

Statistics of shipping and of passenger traffic are as follows:

		1938	1939
Ships entered: number	.	2,158	1,980
	tonnage	1,863,000	1,646,000
cleared: number	.	2,158	1,983
	tonnage	1,859,000	1,645,000
Goods landed: tons	.	406,000	380,000
	loaded: tons	216,000	197,000
Passengers disembarked	.	1,748	549
	embarked	2,937	702

There are no local services of which Catania is the terminus, but, like Messina and Syracuse, the town is a port of call on many services: weekly from Fiume coastwise to Genoa and Valencia, from Genoa to Tripoli, from Genoa to Sicilian ports (two services), and from Genoa to the Black Sea (outward bound only); every 10 days from Genoa coastwise to Venice; fortnightly from Naples to Tripoli, from Genoa to Palestine, Syria, Cyprus, and Crete (outward only), from Genoa to Tobruk, from Genoa to Massawa (outward bound only), from Fiume coastwise to Sardinia and Genoa, from Trieste to Genoa and Marseilles, from Trieste to North Africa, and from Trieste to the gulf of Mexico; twice a month from Genoa to north-west

Europe; monthly from Genoa to Saigon (outward only), from Genoa to Rangoon (outward bound only), from Naples to Benghazi, from Trieste to eastern South America, and the two services, outward-bound, which circumnavigate Africa from Trieste; and 6 times a year from Genoa to Australia. The majority of the services from Genoa call at Naples, and many of them also at Leghorn and La Spezia.

Inland Communications

Catania Centrale is on the single-track line from Messina to Syracuse, from which at Bicocca (4 miles south-west of Catania) a single-track line branches to Palermo via Caltanissetta Xirbi. A single-track line to Caltagirone diverges from the line to Syracuse at Valsavoia, and a single-track line for Schettino (and Mandorano) diverges from the Palermo line at Motta S. Anastasia. Catania Porto is the starting-point of the Circum-Etna railway which runs through the central station to Randazzo and Riposto.

Electric trams traverse the city, and there is a motor-bus service from Catania to the Grande Albergo Etna.

Roads. Catania is on road 114 from Syracuse to Messina. Road 121 goes to Palermo via Enna, and at Adrano a secondary road to Bronte and Randazzo branches from it. A close network of secondary roads serves the lower slopes of Etna and gives access to the motor-road opened in 1935 to the Grande Albergo Etna, 5,600 feet above sea-level.

Airways. Planes from Rome, Naples, and Palermo to Malta formerly called at the Fontana Rossa airport, 3 miles south of the city.

AUGUSTA. Latitude $37^{\circ} 14'$ N. Longitude $15^{\circ} 13'$ E. Population 17,716.

Position and Site (Fig. 39)

Augusta is on the east coast of Sicily, 40 miles north of the south-east point of the island. The town is built on a small, almost rectangular island joined by a bridge to the north shore of the Bay of Augusta. This is a broad bay between Cape S. Croce on the north-east and the Magnisi peninsula on the south, and it is fringed by low marshy and sandy shores. The north coast of the bay borders the plain of Augusta and the west coast the alluvial plain of the F. Mulinello, the northernmost of several smaller interconnecting alluvial plains which are crossed by a number of small torrents. The plain of Augusta is cultivated with vines and olives, and is limited on the east

by the long, narrow, flat-topped terrace of M. Tauro (250 ft.), which falls to the sea in cliffs and forms a peninsula extending in a north-west to south-east direction between Cape Campolato and Cape Izzo. To the north the plain merges gradually into another terrace about 100 feet high. The plains fringing the west coast of the bay rise gradually in a series of terraces to about 100 feet, and then 2 or 3 miles inland steeply to the rugged, barren limestone hills of Cozzo S. Giorgio and Mi. Climiti, which are gashed by steep-sided ravines. The alluvial plains are irrigated and planted with vineyards and citrus groves, whilst narrow strips of citrus-trees have been planted along the valleys of the streams for a few miles inland.

The island of Augusta is low and rocky, and is a little under $1\frac{1}{2}$ miles long and about one-third of a mile wide. The adjacent shore of the bay consists of a low rounded point extending south to within 300 feet of the island and fringed on either side by salt-pans. The island and the point together divide the northern part of the Bay of Augusta in two, the Porto Xifonio being to the east and the Porto Megarese to the west.

The main part of Augusta is on the centre of the island. The town is compactly built with five principal north-south streets and seven principal east-west streets crossing each other at right angles. At the north end of the island are the large Cittadella and public gardens. The southern end has one built-up street along its western shore and a few naval and industrial buildings, whilst the rest is open ground with scattered buildings.

History

Augusta was founded by Frederick II in 1232, on the site of the ancient Greek city of Xiphonia. It was peopled by the inhabitants of Centuripe, a city which the emperor had caused to be destroyed as a punishment for rebellion. In 1676 Augusta was occupied by the French after a naval victory won by Duquesne over the Dutch Admiral De Ruyter, who was mortally wounded in the battle. The city was almost entirely destroyed by an earthquake in 1693.

Public Buildings and Monuments

Augusta has no monuments of any interest except the castle of Frederick II, which has been largely rebuilt and now serves as a prison, and the three old forts of Garzia, Vittoria, and Avalos, entirely surrounded by water, which guard the harbour. These were erected in the sixteenth century by the Spanish Viceroys Garzia di

Toledo and Ferdinand d'Avalos as a protection against Turkish raiders. The cathedral was erected in 1769, in the place of one destroyed by the earthquake of 1693.

Industry

Augusta is essentially a naval base and not of great importance commercially. There are, however, extensive salt-pans along the north shores of both Porto Megarese and Porto Xifonio, which have a total annual output of 25,000 tons. The marine salt industry of Augusta ranks second in Sicily to that at Trapani. The other industries of Augusta are mainly concerned with the processing of local products. There are several canneries specializing in sardines and anchovies, as well as olive-oil presses and wine-making establishments. Cereals, vegetables, tomatoes, citrus and other fruits, olives, nuts, beans, and carob beans are all grown and marketed in the town.

Description of Port

The island on which Augusta is built forms a safe natural anchorage in the north-west of Augusta bay. With the development of the port as a naval base, three breakwaters were built south and south-west from the south of the island to the south-west shore of the bay, and these now enclose a large area of water, some 5 miles long from north to south, and $2\frac{1}{2}$ miles wide. To the east of Augusta island is Xifonio bay, where the only facilities are some piers serving the quarries on the east shore.

Of the three breakwaters the northernmost, the Diga Settentrionale, extends south-south-east for about 2,300 yards from the island. The second, the Diga Centrale, which is detached, is dog-legged and extends south by west for about 870 yards and then south-west for nearly a mile. The third, the Diga Meridionale, also dog-legged, extends about $\frac{3}{4}$ mile east-north-east from a point on the shore 600 yards south of Punta Bagnoli, and then 300 yards north-east towards the Diga Meridionale. All three breakwaters are of rough rubble and the entrances to the harbour are at either end of the Diga Centrale. The entrance to the south is 984 feet wide with depths of 36 to 42 feet, and that to the north, the main entrance, is 1,140 feet wide with depths of more than 108 feet in the fairway. The seaward approaches are deep and unobstructed.

The northern part of the harbour thus enclosed is known as Porto Megarese from the original small commercial basin on the north-west of Augusta. General depths of 30 feet or more are maintained close

in to the west shore of the island, but along the north and west shores of the bay shallows extend for some distance. On the west shore just north of Punta del Cugno there are the five short jetties and the intervening quay of the submarine base. On the shore north of the two island fortresses, Forte Garzia and Forte Vittoria, the seaplane station (1) has a length of quay with a broad projecting jetty, from whose north side a narrow dog-legged breakwater has been constructed to provide a camber. Some 600 yards to the north-east the second quay of the seaplane station has a slip in the centre and one of the few cranes of the port at its east end. On the east side of this northern bite of the bay is the Palma shipyard, where a small floating dock is at present moored. The long jetty projecting south-east serves the Nafta oil depot.

The channel between Augusta island and the mainland to its north is crossed by a light bridge which carries a pipe-line and by a road bridge, stepped across a small triangular island. On the west side of the island the following are the harbour works from north to south. A small camber for naval craft lies immediately south of the bridges. It is partially sheltered on the west by a pier, which is a northward extension of the Banchina Militare, a quay reserved to the Navy. South of this quay is the commercial harbour (4), the Cala del Molo, a roughly rectangular basin enclosed on the south and south-west by a curved point. On its south side a new quay has been started, but only the face, about 170 feet from the shore and connected to it by three gangways, has so far been completed. Near its south end is a stone jetty which lies at the north end of a beach used for hauling up small craft and having two slipways near the root of the jetty. The Porticciolo di Terravecchia (5) is the camber at the south end of the island. The entrance between the eastern quays and the western, dog-legged, protecting mole is about 270 feet wide. The basin is reserved exclusively to the Navy.

Since Augusta has been developed primarily as a naval base, commercial interests have been neglected. There are very few facilities for discharge and nearly all cargoes have to be handled by ships' appliances into or out of lighters.

Facilities. The Captain of the Port's office is behind the north-east corner of the Cala del Molo.

There is a small hand crane on the south-west quay of the Cala del Molo, two electric cantilever cranes, one on each quay of the seaplane station, a small electric crane in the submarine base, and one small floating crane, and one small floating sheer-legs.

Stocks of coal are maintained for the use of the navy and held at the submarine base. Of the four oil depots, one is commercial and three are naval (Appendix II). Water is laid on to the Banchina Militare and in normal times water lighters are available.

The growth of repair facilities has not kept pace with other developments of the port. The Palma shipyard has no slips, and can undertake only small repairs. There are shops near the slips on the south side of the Cala del Molo and south of the stone jetty, but the longest ship that can be accommodated is probably 140 feet long; and only small repairs can be executed.

<i>Name</i>	<i>Depth alongside (feet)</i>	<i>Length (feet)</i>	<i>No. of cranes</i>	<i>Facilities, &c.</i>
<i>Island</i>				
Porticciolo di Terra- vecchia	..	..	..	Purely naval.
East quay	10 to 16 reported	420 (total)	..	Quay divided into 2 parts, 120 ft. long and 270 ft. long; space between these parts forms a dock c. 30 ft. wide and 75 ft. long. Quay parallel to east shore and connected with it by 4 piers, 75 ft. long and 8 ft. wide.
North Quay	10 to 16 reported	390	? 1	..
North quay, east extension	10 to 16 reported	c. 180	..	This extension is a built-out quay similar to east quay.
West mole (dog- legged)				
North leg	10 to 16 reported	225	..	Only north leg is quayed.
SE. leg	..	540	..	SE. leg consists of loose-block breakwater.
Stone Jetty	10 at head, 3 at root	210	..	..
New Quay (close north of Stone Jetty)	c. 10	c. 1,200	..	Quay is built out from shore and about 170 ft. from it. Only small craft appear to use quay.
Cala del Molo	..	..	..	The commercial harbour.
South-west quay (curved)	13 reported	c. 340	? 1	..
East quay	13 reported	c. 370	..	..
North side (stepped)	13 reported	{ 50 (W.) 170 35 (E.)	..	Middle part of quay is set back 36 ft. from end parts. Captain of Port's offices be- hind east part.
Banchina Militare Main quay	17	500+	..	Destroyers and submarines frequently moor stern-to.
Pier extension	17	270	..	East of pier extension is a shallow camber used by small craft.

<i>Name</i>	<i>Depth alongside (feet)</i>	<i>Length (feet)</i>	<i>No. of cranes</i>	<i>Facilities, &c.</i>
<i>Mainland</i>				
Palma shipyard				
2 jetties, each	9	c. 30	..	Craft moor stern-on.
Nafta Oiling Jetty	26 at head; 26 to 11 alongside	550 (total)	..	Jetty in 3 sections. Root, unquayed, 330 ft.; followed by reinforced-concrete extension, 135 ft. alongside both sides of which small ships can moor in 11 ft.; followed by the head, 90 ft. long, at the end of which large ships moor stern-on in depths of 26 ft. or more.
Floating-dock Quay	7	400	..	Floating dock moored off south end.
Seaplane Station:				
North quay	3 to 4	c. 480	1	Slipway projects from middle of quay.
South part of station (at Punta Pila)	..	..	..	..
NE. side of apron	3 to 4	c. 300	..	..
SE. side of apron	3 to 4	c. 90	..	..
Jetty (NE. side)	3 to 6	c. 220	1	NW. part is SW. side of camber. Crane stands at south end of jetty. SW. side and head of jetty in process of extension.
Camber breakwater (dog-legged):				
SW. leg	5	c. 170	..	..
NW. leg	4 to 5	c. 180	..	..
Punta del Cugno Submarine Base:	..	..	..	..
Quay (divided into 5 parts by projecting jetties):				
NW. part	c. 18	100	..	..
Other 4 parts, each	c. 18	..	..	..
Five jetties, NW. to SE.:				
No. 1.	..	85	? 1	..
No. 2.	..	85	..	SE. of No. 2, quay is stepped back 43 ft. from N.W. part.
No. 3.	21 to 18	260	..	..
No. 4.	21 to 18	120	..	..
No. 5.	22 to 18	385	..	Parapet along SE. side. Large tankers moor stern-on to head.

The railway does not cross to the island and only the quay to the north of the oiling jetty is served by railway. The road connexions are nearly as bad: the north and west shores of the Porto Megarese are served only by side roads, while the road bridge from the island is a bare 24 feet wide, with a double bend. A good road runs north

from the Porticciolo di Terravecchia through the centre of the town, but the roads connecting with it from the harbour works on the west of the island are narrow and in some cases have no pretensions to serving the quays.

Trade and Connexions. The commerce of the port is very limited. The average number of ships using the port in any year is between 700 and 900 with a total tonnage of less than 200,000 tons. The quantity of goods discharged was 252,270 tons in 1937, but fell to 87,530 in 1938. Exports, the chief of which are salt and fish, varied in the years preceding the War of 1939-1945 between 40,770 and 23,650 tons.

Inland Communications

Railway. Augusta is on the single-track line from Syracuse to Catania and Messina.

Roads. There are secondary roads from Augusta to Villasmundo on road 114, to Melilli, crossing road 114 farther south, and to Brucoli.

SYRACUSE (Siracusa). Latitude $37^{\circ} 3' N$. Longitude $15^{\circ} 17' E$. Population 43,639. Provincial capital. Seat of archbishopric. Chamber of Commerce.

Position and Site (Fig. 41; Plate 46)

Syracuse, on the east coast of Sicily, is about 30 miles north-north-east of the south-eastern tip of the island. The town is built on the north side of the semicircular bay of Porto Grande and on the small island of Ortigia (Grk. *Ortygia*), which is connected with the mainland by a bridge.

The bay of Syracuse is enclosed on the south by the Maddalena peninsula and on the north by the Acradina (Grk. *Achradina*) promontory, which terminates in the north in Cape S. Panagia and in the south at Syracuse. The cliffs of this promontory edge a terrace above which farther inland rises a steep escarpment 50-60 feet high. The plateau above the escarpment is roughly triangular in shape, having a base about 2 miles long on the seaward side of the promontory and then tapering inland to a point near the ancient fort of Euryalos, about $4\frac{1}{2}$ miles from the coast. The eastern part of the plateau is about 150 feet high and rises westwards in the plateau of Epipoli to about 500 feet. To the west of this plateau is another about 630 feet high with the village of Belvedere on its summit. South of

the plateaux the coastal terrace merges into the small plain of the F. Anapo, which forms the west shore of the bay of Syracuse. The plain is low and flat and much of it is badly drained. Limestone hills rise from the plain about 6–8 miles inland and reach a height of 2,280 feet in M. Grosso.

The town, which is to-day expanding from the island to the mainland in the same way as it did during the period of ancient Greek settlement, is divided into three sections, the town on Ortigia, the suburb on the small peninsula or isthmus west of the north end of the island and separated from it by a channel 180 feet wide, and the northern straggling and untidy quarter of S. Lucia on the promontory of Acradina. The original nucleus in the Greek period and in more recent times was on the island of Ortigia, and both settlements then spread on to the isthmus and then on to the main promontory of Acradina. The Greek settlement in contrast was more compact, and at the date of the Athenian invasion, when it was as large as Athens, covered the island, the isthmus, and the east side of the Acradina promontory, and was entirely walled. The second extension of the area of ancient Syracuse was carried out by Dionysius I (the Elder), who extended the defences to include the entire plateau of Epipoli (Grk. *Epipolae*). This was surrounded with an immense girdle wall as formidable as the later walls of Imperial Rome and enclosing a greater area.

The island of Ortigia which is rocky and rises slightly towards the south and west, is about 1 mile long from north to south and has a greatest width of 700 yards. To-day the south-west of the island is a military zone. The rest is closely built up with houses crowded along extremely narrow and winding streets, though there are a few wide straight streets in the north-west of the island. The new districts on the isthmus and on the mainland have wide straight streets. The quarter of S. Lucia extends from the east coast of the promontory up the gentle slopes leading to the escarpment at the edge of the plateau. There are groups of buildings scattered over the plateau, the most important of which are those in the district of Contrada Cappuccini.

Most of the public buildings are on the island, whilst the main industrial establishments are west of the isthmus round the head of Porto Grande.

History

Syracuse was the most important Greek colony in Sicily and the centre round which the story of Greek rule in the island revolved.

It was founded about 734 B.C. by a Corinthian colony under Archias, who drove out the original inhabitants from Ortygia, the island separated from the Sicilian mainland by a narrow canal which is to-day the principal part of Syracuse. The extension of the ancient

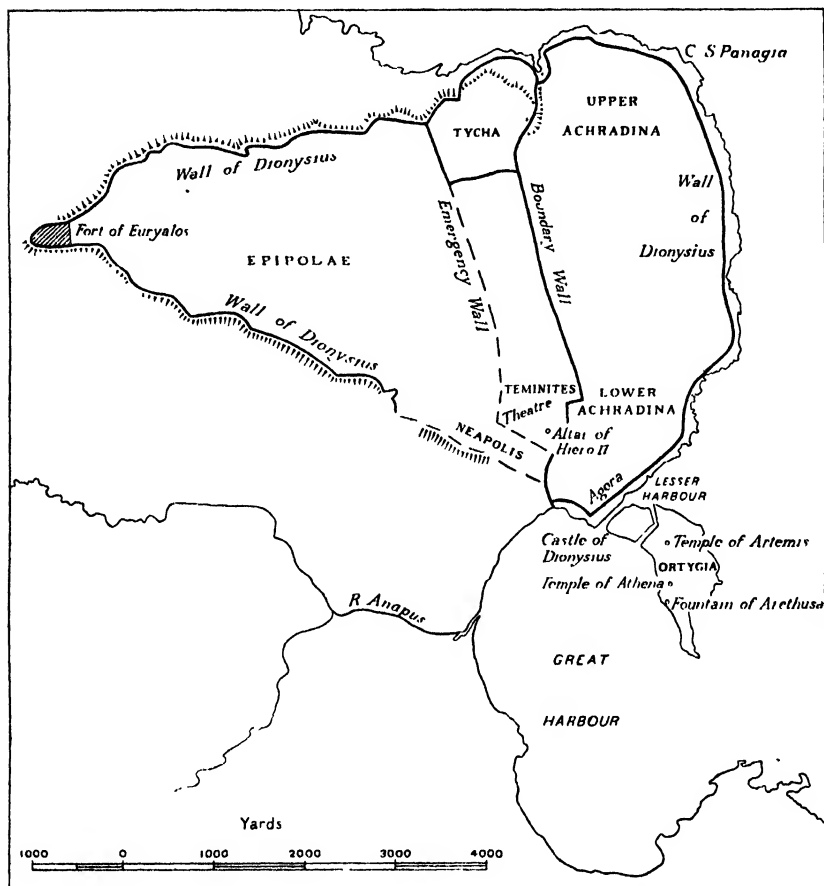


FIG. 40. *Syracuse at the time of the Athenian invasion*

city on the mainland consisted of four distinct suburbs—Achradina, Tycha, Neapolis, and Epipolae—which Dionysius the Elder (406–367 B.C.) surrounded by a massive city wall. In 485 B.C. Gelon, the tyrant of Gela, taking advantage of a civic feud in Syracuse, made himself master of the city and in conjunction with Theron, tyrant of Agrigento, inflicted a defeat on the Carthaginians at Himera (480), which ushered in a period of great prosperity for Greek Sicily.

Hiero (478–467), Gelon's successor, warrior, statesman, and patron of the arts, defeated the Etruscan fleet near Cumae and welcomed at his court the leading Greek poets, among them Aeschylus and Pindar. The misrule of his brother and successor Thrasybulus brought about the banishment of the tyrant and the establishment of a republic (466). Its power and prosperity were such as to excite the hostility of Athens, and to lead to the Athenian expedition (415) against Sicily which Thucydides describes as 'the most important event in Greek history'. The Athenians blockaded Syracuse from both sea and land, but Sparta came to her help and the war ended in 413, with a resounding victory over Athens and the destruction of her fleet and armies. A few years later Syracuse was threatened by the Carthaginians, and the city placed its destinies in the hands of Dionysius the Elder, who frustrated Himilco's attempts at a siege (397), and made Syracuse the mistress of Sicily. His successor Dionysius II (367–343) gave himself up to pleasure and the danger from Carthage was renewed, but help came from the mother city of Corinth in the shape of Timoleon, who at the head of a thousand men delivered Syracuse from her enemies and re-established the republic. In 317 Syracuse came under the power of the last of her great despots, Agathocles, cited by Machiavelli as an example of the successful ruler who gained power by means of crime. He concluded a peace with the Carthaginians which left him supreme throughout Sicily and made Syracuse almost as powerful as it had been under Dionysius I. A period of decline followed his death by poison in 289, but in 278 his son-in-law Pyrrhus again wrested the whole of Sicily from the Carthaginians. On the departure of Pyrrhus, Hiero II (276–216) became despot of Syracuse and, by means of an alliance with Rome, succeeded in preserving the city's independence. The poet Theocritus and the mathematician Archimedes, both natives of Syracuse, were among the eminent men of his court. Hiero II's successor went over to the side of Carthage, with the result that Syracuse was besieged by Marcellus and fell to Rome after two years of fierce resistance (214–212). Enormous booty was carried off to Rome, and Syracuse was ruled by Roman officials, among them Cicero, who pronounced it to be 'the largest of Greek and the most beautiful of all cities'. In the sixth century A.D. under Belisarius, Syracuse was once more the capital of the island and from 663 to 668 it was the seat of the Emperor Constantius IV, but its great days were over and after its destruction by the Saracens in 878 it was never again of first-rate importance. During the thirteenth century it was occupied first by the Pisans and then by the Genoese.

Charles V did his utmost to develop it as a port but an earthquake in 1693 and subsequent outbreaks of plague destroyed its prosperity. In 1837 it rose against the Bourbons and was punished by the transference of the seat of the provincial government to Noto. The Italian occupation of Libya in 1911 brought about a revival of trade, and renewed building activity.

Public Buildings and Monuments

The old city of Syracuse, on the island of Ortigia, retains much of its medieval character. The cathedral of Sta. Maria delle Colonne is an interesting adaptation of a Doric temple of the fifth century B.C. to the needs of Christian worship. The outer columns of the temple are incorporated in the walls of the church and recent careful restoration has recaptured the simple and impressive appearance of the original building. Pompeo Picarale, a native architect, was responsible for the dignified baroque façade (1728-1757). The Archaeological Museum contains an admirably arranged collection of antiquities, of which the most famous is the Landolina Venus, a headless statue of the goddess newly risen from the sea, discovered in 1804. Palazzo Bellomo, a thirteenth-century building which has undergone several restorations, contains the medieval portion of this museum, including a charming Annunciation by Antonello da Messina (1474). At the southern tip of the island is the Castello Maniace, founded by the Byzantine general George Maniakes, who freed Syracuse from the Saracens (1039), and rebuilt by Frederick II. Chief among classical remains are the ruins of the temple of Diana, or more probably of Apollo, the oldest Doric temple in Sicily. The promenade of the Marina, with the celebrated fountain of Arethusa at its farther end, commands a superb view of the Porto Grande. On the mainland, near the modern railway station, are the remains of the Greek Agora, or market-place. The principal monuments in the ancient suburb of Acradina, are the church of Sta. Lucia, built on the spot where the patron saint of Syracuse suffered martyrdom and retaining its Norman portal and apses, the Latomia dei Cappuccini, one of the most beautiful of the ancient quarries, which it is believed served as a prison for the 7,000 Athenians captured in the war of 413 B.C., and the Catacombs of S. Giovanni, which form a great subterranean city, far larger than the catacombs of Rome. In the suburb of Neapolis is the Greek theatre, the most celebrated of all the ruins of Syracuse, in which natural beauties are wonderfully combined with technical skill. Founded in the fifth century B.C. it was enlarged by Hiero II

and by the Romans. Near it is the Amphitheatre, an imposing Roman building of the Augustan era. Other interesting remains are the *Latomia del Paradiso*, one of the quarries which yielded the material from which the ancient city was built, the Altar of Hiero II, on which 450 oxen were sacrificed yearly in thanksgiving for the delivery of Syracuse from tyranny, and the Ear of Dionysius, a grotto hewn in the rock in which every sound is highly magnified. The Castle of Euryalus, built under Dionysius I at the western extremity of ancient Syracuse on the plateau of Epipoli, is the most complete Greek military work extant.

Industry

Syracuse is in a region mainly dependent on agriculture and tunny-fishing for its prosperity, and there are few industrial plants except for those processing local products. The town is a centre of the Sicilian wine trade and the vineyards in the neighbourhood produce wines of the Moscato and Albenello types. Syracuse is also a market for the fruit and vegetable trade with the Italian mainland. Cereals, vegetables, tomatoes, fruit (citrus and olives), beans, and carob beans are grown locally. Several establishments in the town make olive oil and sulphur oil, the S.P.E.R.O. establishment being the largest. Numerous small works prepare citrus-fruit products, including calcium citrate. There are also chemical works making fertilizers, flour mills, pasta and biscuit factories, and repair shops for small ships.

Description of Port

Syracuse has one of the finest natural harbours in Sicily. The main part of the port, the Porto Grande, lies in the north of an oval, almost land-locked bay, protected on the north-east by Ortigia island and on the south-east by the Maddalena peninsula. North of Ortigia is a shallow bay, the Porto Piccolo, which has been protected by two breakwaters, and is connected to the Porto Grande by a canal. The bridge linking Ortigia to the mainland, the Ponte Nuovo, crosses this canal and prevents the passage of any but small boats.

The seaward approaches are deep and unobstructed save from the north. Scoglio Tondo is an island, 300 yards off shore and 650 yards north-east of the entrance to the Porto Piccolo, and Scoglio del Cane, a rock almost awash, lies a similar distance off the easternmost point of Ortigia. The main anchorage is in the south of Syracuse bay.

The Porto Piccolo is only available for small craft. The entrance between its two rough breakwaters is 170 feet wide and 17 feet deep.

General depths in the basin are nowhere greater than 11 feet, and considerably less alongside. The S. Lucia landing-jetty is the only facility on the north-west shore, but the west and south-west shores and the sides of the canal north of the bridge (known as the Canale) are all quayed. Jetties project on both sides of the Canale, and the length of shore to its west, which has a slip, is separated by a third jetty from the Darsena Montedora to its west. This is a small boat camber enclosed on the north by a jetty built eastwards from its north-west corner. Outside the Porto Piccolo a pier about 480 feet long extends north-eastwards from a point some 50 yards east of the root of the southern breakwater.

The entrance to the Porto Grande, facing east-north-east, is a little less than $\frac{3}{4}$ mile wide, but shoals on north and south narrow the effective channel (i.e. with depths of 26 feet or more) to 670 yards. General depths inside the bay are more than 18 feet everywhere except close alongside the southern part of Ortigia and in the north-west.

The western shore of Ortigia is backed by a high wall in its southern half. Midway the Port Offices jetty (1) projects westwards and from this point northwards quays extend in two stretches to La Darsena, the southern half of the canal to the Porto Piccolo. At the angle of the two stretches the Pontile Zanagora projects south-west. Both sides of La Darsena have quays, and the Banchina della Stazione Marittima (4) continues these quays westwards to the root of the broad Molo S. Antonio. Although this last is well served by both standard- and narrow-gauge lines, it is not yet fully developed. In the north of the bay, 600 yards west of the Molo S. Antonio, there is a seaplane station (5), and the area to its south is reserved for seaplanes. The shore west of the mole is shoal and not quayed, and there are no facilities other than the slipway close west of its root.

The quays of the Porto Grande vary between 3 and 6 feet in height, as follows: the southernmost jetty, 3 feet; the western Ortigia quays, 4 feet; the Molo S. Antonio and the quays to its east, 6 feet. Berthing is usually alongside, although alongside depths are not great south of La Darsena and catamarans may be necessary.

Syracuse has, owing to the War of 1939-1945, lost a great deal of its previous importance, since it was mainly concerned with the tourist trade.

Facilities. The Port office is at the root of the Port Offices jetty midway along the western shore of Ortigia. The customs-house is behind the quay on the north-west side of La Darsena.

The only warehouse is the customs-house. Of the three cranes,

two, one on either side of the Molo S. Antonio, are travelling electric cranes of $2\frac{1}{2}$ tons capacity, and the third is a hand crane of 3 tons capacity on the south-east side of La Darsena.

Only small stocks of coal are maintained, and there are no oil supplies. An ample supply of water is laid on to most quays, and in peace-time ships at anchor could be supplied by water-boat. The western quays of Ortigia and the Banchina della Stazione Marittima are electrically lit.

Small craft only can be dealt with at the three slipways of the port. These are, respectively, west of the root of the Molo S. Antonio, immediately west of the mouth of the Canale, and in the Darsena Montedora. Boats can be careened in the basin leading north-west from La Darsena and near the bridge. There are no other facilities.

Standard-gauge lines (not flush) serve the centre and east side of the Molo S. Antonio, the Banchina della Stazione Marittima, near the east end of which is the harbour station, and, by a loop north of the station and a turntable, the north-west quay of La Darsena. These lines unite north-westwards and are joined to the main line west of the main station. The narrow-gauge line from Ragusa continues from its station, 200 yards west of the main station, to the west quay of the Molo S. Antonio. All quays are well served by road, but traffic from the Ortigia quays has to move northwards and converge on to the Ponte Nuovo to cross the canal. From the quays west of the canal there is exit to the main roads at either end of the wall along the south side of the Via Rodi.

Trade and Connexions. The main imports in normal times are black olives, cereals, coal, iron, and timber; the exports, citrus fruit, vegetables, carob beans, asphalt, and tunny in oil.

Statistics of shipping and of passenger traffic are as follows:

		1938	1939
Ships entered: number	.	1,509	1,363
	tonnage	1,454,000	1,509,000
Ships cleared: number	.	1,495	1,391
	tonnage	1,453,000	1,510,000
Goods landed	.	83,000	78,000
	loaded	69,000	83,000
Passengers disembarked	.	53,867	67,421
	embarked	56,974	68,412

There are weekly sailings both to Tripoli and to Benghazi, and Syracuse was a port of call on the following services: weekly from Genoa to Sicily, giving connexions to other Sicilian ports, and from Valencia to Fiume; fortnightly from Naples to Tripoli, two services,

one of which on the homeward run continues to Genoa, from Naples to Benghazi, from Genoa to Alexandria, Haifa, and Beirut (outward only); from Fiume coastwise to Sardinia and Genoa; and from Trieste coastwise to Genoa with connexion to Morocco; and monthly from Genoa to Massawa (outward only).

No.	Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
1	<i>Porto Grande</i>				
	Port Offices jetty . . .	..	..	..	Landing for local steamers.
	North side of extension	17	60	—	Head 51 ft. wide.
	Main jetty . . .	5-16	90	—	Extends 73 ft. in front of No. 2.
2	Banchina del Foro Vittorio Emanuele	12	1,200	—	Stern-to destroyer berth. Quay 8 ft. wide and 2 ft. above level of Foro. Foro backed by high wall. Landing-steps protrude at middle and north end. Southern 160 ft. shoal.
	Pontile Zanagora .	26	230	—	Agricultural produce.
	Calata di Piazza Mazzini	..	500	—	Asphalt. Dredged to 26 ft. at 13 ft. off.
	La Darsena				
	South-east side .	13-26	680	1	Sailing craft with olives and carobs.
	North-west side .	26	440	—	Careening basin at north end. Customs-house behind quay.
4	Banchina della Stazione Marittima .	26	660	—	Mail and passenger steamers. Harbour station near east end.
	Molo S. Antonio .	..	..	..	Quay faces complete and rail tracks laid, but otherwise not developed.
	East side . . .	26	710	1	..
	Head . . .	26	490	—	..
	West side . . .	26	690	1	Northern 280 ft. shoal.
5	Seaplane station . . .	..	..	..	Available for small craft only.
	East jetty . . .	1-5	200	—	..
	North quay . . .	c. 3	335	—	..
	East quay . . .	c. 1	365	—	..
	South end:				
	East jetty . . .	..	85	1	Depth of 5 ft. at head. Crane is a cantilever for seaplanes.
	Quay . . .	c. 2	150	—	..
	West jetty . . .	1-3	150	—	..
	<i>Porto Piccolo</i>				
	Canale				
	East side . . .	6-9	480	—	Further 200 ft., dog-legged, at north end.
	West side . . .	6-9	320	—	Dog-legged.
			+110		
	S. Lucia jetty . . .	c. 1	40	—	Boat landing-stage.

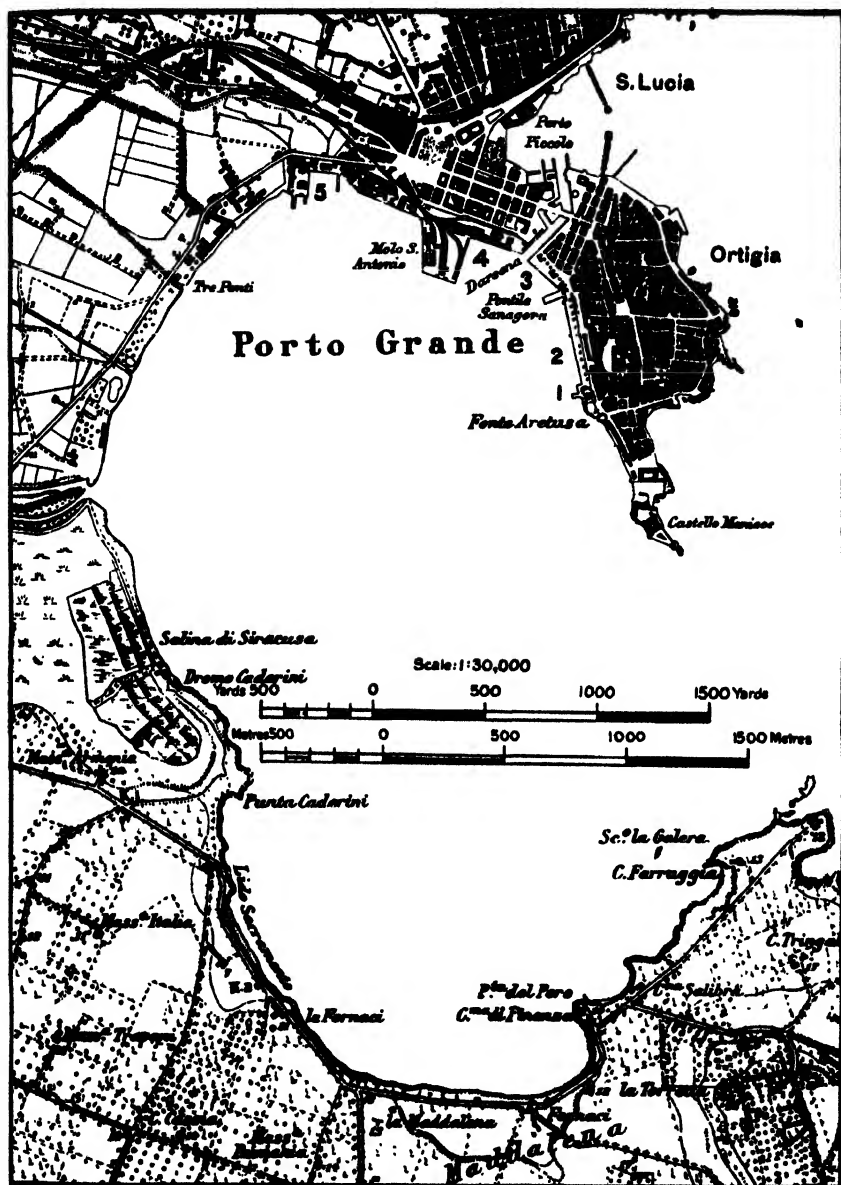


FIG. 41. Syracuse

Inland Communications

Railways. A single-track line runs from Siracusa Marittima through the Central Station, where trains reverse, to Messina via Catania. From the Central Station a single-track line continues the railway from Messina to Canticatti via Noto, Ragusa, Gela, and Licata. A narrow-gauge railway also goes to Ragusa via Giarratana, the junction for Vizzini-Licodia.

Roads. Road 114 goes from Syracuse to Catania and Messina, road 115 along the south coast to Trapani, and road 124 to Caltagirone. A network of secondary roads also serves the neighbourhood of Syracuse.

Airways. From the Filippis seaplane station there were formerly air-services to Rome, Naples, Malta, Tripoli, Benghazi, Cairo and Khartoum.

ZARA (Zadar). Latitude $44^{\circ} 7' N$. Longitude $15^{\circ} 13' E$. Population 20,055. Provincial capital. Seat of bishopric. Chamber of Commerce.

The territory of Zara is a roughly rectangular region on the coast of the mainland of Yugoslavia, where, between the Canale della Morlacca to the north and Šibenik to the south, there is an area of coastal lowland contrasting with the steep Dalmatian coast everywhere else. This Italian enclave in a Croatian region lies between the other two Italian possessions in Dalmatia, the islands of Lussino and Lagosta. Together with Lagosta, the territory of Zara forms an Italian province with only the two communes. The territory has a low irregular coastline about $5\frac{1}{2}$ miles long, with the town of Zara about midway along it, and extends inland for $3\frac{1}{2}$ –4 miles. The total area is 21 sq. miles. The frontier is over 15 miles long and has ten frontier posts. No conspicuous features of relief delimit the Italian enclave.

The total population of the territory is 20,055, of which 12,838 live in the town. The population of the town itself is mainly Italian in language, sentiment, and culture, and the appearance of the town is typically Venetian. The inhabitants of the rural parts of the enclave are Croats.

The town, which is the market and route centre of the territory, is mainly built on the north-west end of a very low and flat peninsula which parallels the coast. Recently, however, Zara has expanded on to the mainland opposite and south-eastwards along the rest of the peninsula.

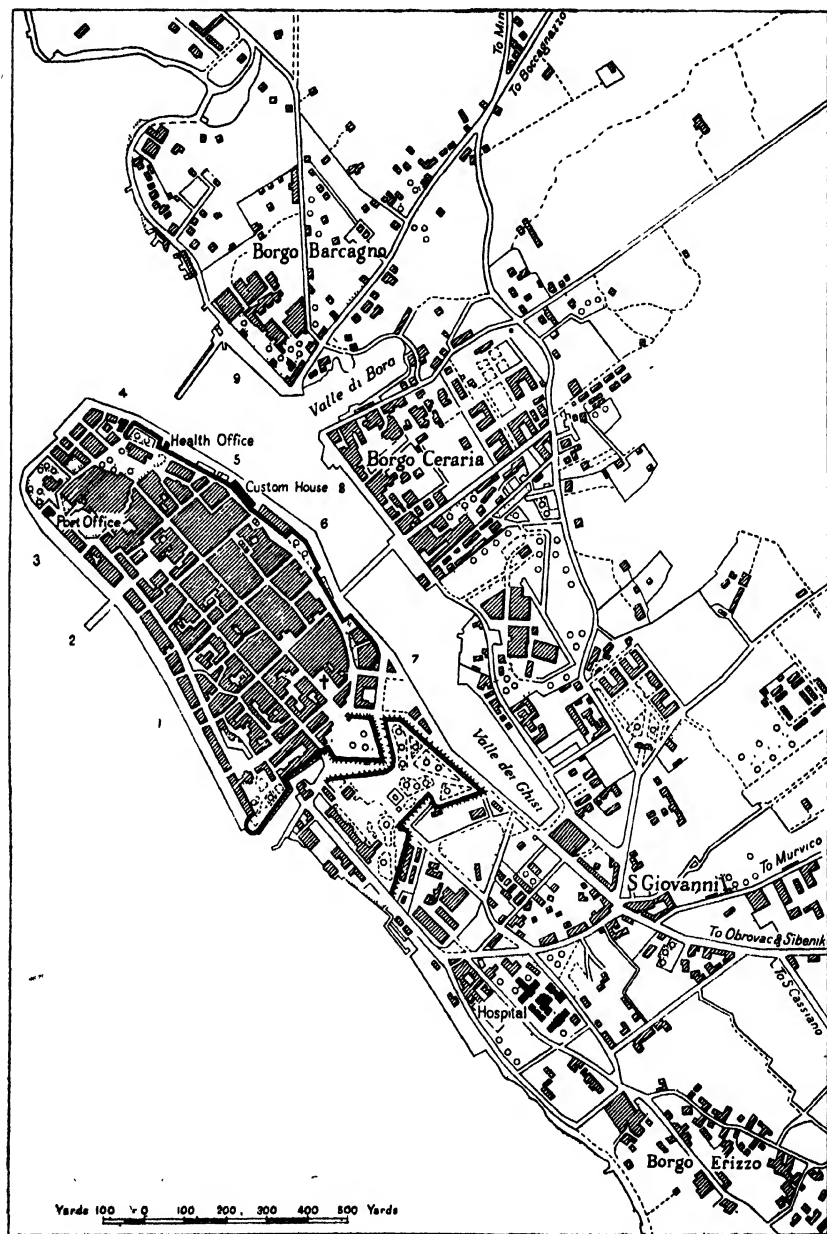


FIG. 42. Zara

Topography and Site (Fig. 42).

Zara and its territory are on the west coast of the large Kotar peninsula (Ravni-Kotari), which is bounded on the south-west by the Canale di Zara (Zadarski Kanal) and on the north-east by the Canale della Morlacca (Velebit Kanal). The peninsula is continued northwards by the islands of Pag and Vir, from which it is separated by narrow straits. The Kotar peninsula, which is 12-20 miles wide, consists of low undulating limestone ridges stretching from north-west to south-east like most of the physical features of northern Dalmatia. The average height of the bare rocky ridges is 350 feet, and that of the intervening valleys filled with fertile red soil is somewhat lower. To the east of the Canale della Morlacca, 22 miles north-east of Zara, the long narrow range of the Alpi Bebie, or Mi. Velebiti, rise steeply like a wall to a height of 5,768 feet. They dominate the whole coastal lowland and are often clearly visible from Zara. The west coast of the Kotar peninsula is paralleled by a series of longitudinal islands, islets, and numerous shoals separated by longitudinal channels. The Canale di Zara (Zadarski Kanal), the channel immediately bounding the mainland, is about 3 miles wide off Zara and about $1\frac{3}{4}$ miles wide at its south-east end off Biograd (Zara Vecchia). Across it lie the islands of Uljan (Ugliano) and Pašman, consisting of another long parallel and somewhat higher limestone ridge (660 ft.), beyond which again about 10 miles farther south-west across the Canale di Mezzo and several smaller islands is yet another ridge formed by the islands of Dugi (Isola Lunga or Grossa) and Kornat (Coronata) before the open Adriatic is reached.

In the enclave of Zara the country slopes gently inland for $1\frac{1}{2}$ miles to a limestone ridge which parallels the general line of the coast. This ridge is highest in the south of the territory at Malpaga (407 ft.), and decreases gradually in height north-westwards to 226 feet at Blaski gaj. The short T. del Cimetiro (T. Becino), the only stream in the enclave, cuts through the ridge in a steep-sided narrow valley. East of the ridge is the depression of the Cbobnica Dolnja, at the northern end of which is the Bokanjacko blato. This lake, only half of which is in the territory, dries up in summer. The lower slopes of the ridge near Zara are covered with small irregular fields divided by limestone walls or banks. The summit of the ridge is rocky and mainly barren, whilst the fertile red soil in the depression is cultivated. The whole territory, however, tends to have but a sparse vegetation, as the soil is generally thin above the limestone. Olives, peach, fig, almond, and cherry trees are often grown round the edge of the fields, where

grain is cultivated. Zara, therefore, has mainly to be supplied with food from the neighbouring Yugoslav territory, especially from the island of Uljan.

The peninsula, on the north-west end of which the old town of Zara is built, consists of a tongue of land 2 miles long and 400-500 yards wide, parallel to the general trend of the coast and joined eastwards to the mainland by a low neck of land almost a mile wide. To the north and south of this isthmus are inlets. The northern, known at its head as the Valle dei Ghisi, is about 400 yards wide at its entrance and slightly less than 200 yards wide for almost its entire length of about 1,500 yards. It forms the main part of the port of Zara, together with the small cove of the Valle di Bora, 250 yards long and 100 yards wide, which bites north-eastward into the mainland. The southern inlet, the Valle di Bredgetti, is 500 yards wide where it opens on to the Canale di Zara, and 700 yards long. The head of this inlet has been reclaimed and partly built over.

The north-western end of the peninsula, which is the site of the main part of Zara, lies no higher than 26 feet and is approximately oblong in shape. It is about 900 yards long from north-west to south-east, and is about 250 yards wide at its blunt north-western extremity, though it widens to over 500 yards at its south-east end. It is naturally continuous with the shorter southern half of the peninsula, though the Venetians in the seventeenth century cut through it and made a moat. This has now been partly filled in, and its south-western end alone remains to form the small boat harbour of La Fossa. The southern part of the peninsula is about 350 yards wide, rises to a maximum height of 46 feet, and narrows south-eastward to a sharp point, Point Collovare. This part of the peninsula is occupied by the straggling township of Borgo Erizzo (Arbanasi; pop. 4,000), where Catholic refugees from Moslem Albania were allowed to settle in 1823, and still preserve their language and customs.

The main part of Zara is the original town on the north-western end of the peninsula. The central section of the town still clearly shows the original Roman grid pattern of its streets. Calle Larga in this section still is, and always has been, the main and most-crowded street with the best shops. The north-east and south-west limits of the Roman town are marked by the lines of the Calle S. Demetrio-Calle S. Grisogono-Calle S. Rocco-Calle del Paradiso, and by the Calle S. Maria-Calle del Tribunale-Calle S. Domenico. Between the Roman town and the Venetian walls the pattern is less regular and betrays Venetian origin. The Venetian bastions are preserved on the

north-east sides. Their demolition along the west side of the peninsula has left space for a wide coastal street, lined inland by tall blocks of modern buildings and other wide roads. On the north-east side, despite the survival of the bastions, there are two streets corresponding to those on the south-west side. Thus the greater part of the peninsula of Zara is encircled by a double ring of modern streets. The Venetian bastion to the south of the town is now the Giardina Regina Margherita, and the site of the fortress south of the bastion is the Parco Regina Elena. The streets in the rest of the town, which are mainly called *calli* after the alleys in Venice, are very narrow and are hardly suitable for motor transport. The old town of Zara is residential and commercial and contains almost all the public buildings. With a few exceptions it has no industries, which are almost all along the east side of the port and around its head, the Valle dei Ghisi. The civil administration and other public buildings are mainly grouped around Campo V. Dandolo on the south-east side of the old town. Buildings concerned with the port and the Navy are towards the north point of the peninsula. There does not appear to be any distinction within the town of Italian and Croat quarters. This national division is rather a distinction between town and countryside.

In modern times, and more especially since the Italian occupation, Zara has expanded greatly beyond the old Venetian city. Across the harbour, and on either side of the Valle di Bora, two suburbs have developed: Borgo Barcagno to the north, and Borgo Ceraria to the south. Borgo Barcagno, except for the large Luxardo maraschino distillery and the smaller Vlahov distillery, is mainly residential, with villas and bathing establishments. Villas are scattered along the coast as far as Seconda Valle di Maistro. Borgo Ceraria is industrial and commercial and also has two very large barracks and a boat-yard. It is joined to old Zara by the Ponte del Littorio, a 492-foot long reinforced concrete bridge 20–24 feet wide with a central swing span of 49 feet. At the south end of the Valle dei Ghisi, and partly on the isthmus, is the suburb of S. Giovanni, centred on its important junction of five roads, and more or less continuous with Borgo Erizzo to its south. S. Giovanni consists mainly of blocks of modern flats, but also has a few small factories. There is also some scattered building along the roads to Murvico (Murvizza) and to Obrovac (Obbrovazzo) and along the coast north of Borgo Barcagno towards Point Amica and the Valle di Maistro. There are a number of small outlying hamlets in the territory, including Boccagnazzo (Bokanjac, pop. 1,256), Malpaga, and Cerno.

History

Ancient Times. Zara is an ancient city, although of its earliest inhabitants, the Liburni, little is known but their name. It first appears in history in 384 B.C., as the enemy of the Greek colony of Lesina, its chief aim then, as throughout the centuries, being to maintain its independence. Owing to its trade in oil and wine it was frequented by Greek and Levantine merchants; thus it imbibed Greek culture and became rich and flourishing. Meanwhile Rome was engaged in a struggle with the Illyrians, and by the time of Augustus her authority over Dalmatia was established and the coast towns had become latinized. Zara, under its Latin name of Jadera, supported Caesar in his war with Pompey and thus became the recipient of imperial favours. Walls and towers were erected which proved sufficient to protect it against barbarian attacks, and it became the chosen home of time-expired Roman legionaries who settled there when their service ended instead of returning to Italy. On the break up of the Empire, Zara remained in the western portion, and so came with Italy under the rule of Odoacer and Theodoric. In 535 Justinian brought it into the Byzantine Empire and placed it under the control of the Exarch of Ravenna. After Ravenna had fallen to the Lombards (751), Zara became the principal base of the imperial fleet in the Adriatic and the capital of the Dukes of Dalmatia. When Charlemagne was at the height of his power, Duke Paolo, accompanied by Bishop Donato of Zara, went to his court to defend the interests of the province. Charlemagne, however, finding himself no match for the Byzantines at sea, abandoned his attempt to establish his authority over Dalmatia and in 812 acknowledged the rights of the Eastern Empire. From that time Zara, while nominally subject to Byzantium, became in fact all but independent.

The Coming of the Slavs. A new phase in the history of Zara began with the immigration of Slavonic tribes into Dalmatia and their growing pressure on the cities of the coast. Zara, like other latinized municipalities, spoke the Roman language and was governed by the Roman law. The Slavs represented an alien civilization which threatened to overwhelm that of the cities and at the same time to destroy the trade of the Adriatic by pirate raids. Finding that the Eastern Empire was powerless to afford protection to its subjects, Zara turned for help to the Venetian Republic. When in 998 Doge Pietro Orseolo set sail from Venice and swept the Adriatic free of pirates, he was welcomed in Zara as a deliverer and the citizens swore allegiance to him. On his return to Venice he assumed with general consent the

title of Duke of Dalmatia. Zara's twofold aim remained, however, political and economic independence, and this conflicted with the determination of Venice to be sole mistress of the Adriatic. When the appearance of the King of Hungary as a rival claimant to Dalmatia opened up a struggle which lasted for three hundred years, Zara gave her allegiance alternately to Hungary and Venice, as best suited her own interests. In 1105 King Colman of Hungary laid siege to Zara and received its submission. After his triumphal entry into the city, he confirmed its ancient privileges and built the tower of the church of Sta. Maria as a sign of his beneficent intentions towards his new subjects. A few years later Zara was recovered for Venice by the Doge Ordelafo Falier, and when in 1145 the episcopal see of Zara was raised to metropolitan rank, the new archbishop was made subject to the Venetian Patriarch of Grado. The refusal of the citizens to acknowledge the authority of the patriarch coupled with their desire for a count of their own choosing were the ostensible causes of the first revolt of Zara from Venice (1180) and the offer of their allegiance to Bela III of Hungary. The re-establishment of Hungarian rule led in turn to what is perhaps the most famous episode in the history of Zara, the diversion of the Fourth Crusade to the reconquest of the city for Venice.

The Fourth Crusade. Some great French nobles, encouraged by Pope Innocent III, pledged themselves to the recovery of the Holy Land from the infidel. A treaty was accordingly made with Venice in 1201 whereby the republic agreed to supply the Crusaders with ships and provisions necessary for their transport, in return for 85,000 silver marks. In the following summer the crusading army mustered in Venice, but only a small part of the sum agreed upon was forthcoming. The Crusaders were interned on the island of Litorale di Lido, and threatened with starvation if they failed to pay up. Thus they were forced to comply with the suggestion that they should redeem their debt by helping the republic to reconquer Zara. Despite papal protests the fleet set sail for Zara and the city, assaulted from both land and sea, yielded after a five days' siege. The sack which followed left Zara in ruins and many of the inhabitants fled into Hungarian territory before the fury of a Christian army, which had proved more destructive than any previous assault of the barbarians. It was now mid-November, so the Crusaders settled down in Zara for the winter, and here made a treaty with Alexius, the son of the deposed Emperor of Constantinople, whereby the crusade was again diverted from its true object to an attack on another Christian state.

In April 1203 the Crusaders set sail for Constantinople, and Zara made terms with Venice, agreeing to receive a Venetian count and to acknowledge the Patriarch of Grado as her ecclesiastical superior.

Zara in dispute between Venice and Hungary. During the greater part of the thirteenth century Zara remained Venetian and enjoyed very considerable prosperity. Well fortified and well armed, she had little to fear from the Slavs without her walls, for Croatia, once independent and aggressive, was now a mere province of Hungary. Within the city the arts flourished. A new cathedral, which replaced that destroyed by the Crusaders, was built and consecrated, and work was continued on the beautiful basilica of S. Grisogono. Nevertheless the citizens were restive under the Venetian yoke, and in 1242, 1312, and 1345 there were fresh revolts followed by brief periods of submission to Hungary. In every case the motive of revolt was the desire of the Zaratini to live under their own laws and to regulate their affairs without interference from any external authority. By the Treaty of Zara in 1358 it seemed as though the city had passed finally under Hungarian suzerainty. Louis the Great of Hungary (1342-1382), after repeated and determined attacks on Dalmatia, forced the Venetians to relinquish their hold upon all its chief cities, Zara being mentioned by name in the treaty. On Louis's death, however, Hungary was plunged into a war of succession, and the rival candidates competed for Zara's allegiance. One of these, Ladislas, King of Naples, was crowned King of Hungary in the cathedral of Zara in 1403, but he failed to establish his claim over other parts of his dominion, and in 1409 he sold Zara to Venice for 100,000 gold ducats. From that time until the fall of the republic Zara was Venetian.

Zara under Venice. For nearly four hundred years Zara was subject to the Venetian Republic, and on the whole she had good reason to be satisfied with her lot. Venice, it has truly been said, 'carried with her justice, culture, and vigour'. The walls were rebuilt in accordance with the new fifteenth-century technique of fortification, and the city was made safe against the growing menace of the Turks. Fine public buildings were erected, conspicuous among them being the elegant Loggia Civica (1565) designed by Sammicheli. Zara produced at least one sculptor of conspicuous merit in Francesco di Laurana (1456-1502), and in all probability Luciano di Laurana, the architect of the ducal palace at Urbino, was also a native of the city. From the end of the sixteenth century Zara was the seat of the Proveditore Generale, the civil and military head of the Venetian Government in

Dalmatia and the adjoining territories. As the Turks pressed farther into the Balkans, Slavs who fled before them found refuge within the jurisdiction of the city and in 1720, Borgo Erizzo, a suburb of Zara, was granted to a colony of Albanians who had left their homes rather than become Moslems. In the declining years of Venice the policy of the Government with regard to Dalmatia became increasingly repressive. Government agents kept the Senate informed of everything that was said and done, the secret police inspired general terror, and persons considered dangerous by the authorities mysteriously disappeared. Education was discouraged, and Zara had no printing-press until 1796. Italian was the official language of the whole province and Italians had a monopoly of the public offices, despite the overwhelming Slavonic majority in Dalmatia. In Zara, a miniature Venice in her political and social life, the Venetian system was accepted without question. The Zaratini were Italian in speech and tradition, and it was no hardship to them to go to Bologna or Padua if they wished to study at a University. The general effect of Venetian rule was, however, to deepen the agelong cleavage between Latin and Slav. Lucio, the eighteenth-century historian of Dalmatia, observes that there always had been and were in his day 'two classes of men in the cities of Dalmatia': one class living by the produce of the land, the other by that of the sea. The prosperous Italian merchants and artisans of the town looked down on the Croatian peasantry of the countryside, who, for their part, regarded their wealthier neighbours with jealousy. Failure to reconcile the interests of these two classes, each dependent on the labours of the other, has been the tragedy of Zara, as, indeed, of all Dalmatia.

Zara under France and Austria. In 1797, by the Treaty of Campoformio, Zara, with other parts of the Venetian dominion, was made over by Napoleon to Austria. At the Peace of Pressburg (1805) Napoleon took back his gift and Zara was annexed to the kingdom of Italy. From 1810 it formed part of the short-lived kingdom of Illyria, under the enlightened government of Marshal Marmont. In 1813 the Austrians returned to Zara after besieging it for thirty-two days, and their possession was confirmed by the Congress of Vienna. That Zara mourned her Venetian overlords is seen by the solemn ceremony with which the banners of St. Mark were taken down and placed beneath the high altar of the cathedral on the entry of the Austrians in 1797. Austrian rule, however, brought no great changes in the life of the city. Austria's main concern was to keep what she

had got, and the system which she found at work in Dalmatia did as well for holding down the province as any other. Zara was not materially affected by the policy of discrimination in favour of the Slavonic population, adopted by Austria as a means of maintaining her control over the Adriatic against the claims of 'Italia irredenta'. While the Croats gained control of Spalato, Šibenik, and other Dalmatian municipalities, which were to large extent Italian in population, Zara remained in Italian hands. According to the Austrian census of 1910, there were in the city 3,532 Serbo-Croats and 9,278 Italians, a figure which represented half the entire Italian population of Dalmatia. Thus when in the negotiations which followed the first World War Italy failed to make good her claims to Dalmatia, she was able to retain Zara, by the terms of the Treaty of Rapallo (1920), negotiated with Jugoslavia. From that time until 1944 the Italian province of Zara consisted of the city itself and a small wedge of land about 5 by 3 miles behind it, together with the island of Lagosta. This last had been a dependency of the Republic of Ragusa until 1810, had passed to Austria in 1815, and had been assigned to Italy by the Treaty of Rapallo.

Zara Italian. In 1918, two years before the settlement at Rapallo, an Italian torpedo-boat entered Zara, where the citizens had already torn down the Austrian eagles and hoisted the Italian flag over public buildings. For the next twenty-five years everything possible was done to emphasize the advantages of the connexion of the city with Italy, and to increase its prosperity. Business and educational facilities were open to the citizens, steamers sailing from Venice stimulated the tourist industry, and Zara's speciality in drinks, the rich maraschino, was advertised throughout Italy. Although Italy was bound by the pact of Sta. Margherita (1922) to give fair treatment to the Slav minority in Zara, the same merciless process of Italianization was practised here as in other parts of Venetia Giulia under the Fascist regime. Jugoslavia retaliated by ignoring the existence of Zara as a port, and it became a tiny Italian island, surrounded by a turbulent and resentful Slavonic sea. The collapse of Italy in September 1943 was followed by a German occupation of Zara, which brought down upon it the fury of Allied bombing. In November 1944, when the Germans retired, the Jugoslavs took possession. In the following spring, official figures from Belgrad gave the population of Zara as 9,314 Jugoslavs and 631 Italians. Flight, deportation, and violent death had reduced the once dominant race to a handful calling itself 'the Anti-Fascist Italian minority in Zadar'. This acceptance

of defeat marks the end of a Latin civilization which for a thousand years had held out against the Slavonic inrush.

Art and Architecture

Zara is a picturesque city, typically Venetian in appearance, with narrow streets, called by the Venetian name of 'Calli', and with the winged lion of St. Mark figuring on some of its principal monuments. Among its churches, public buildings, and private houses are included many of the most beautiful and interesting examples of Dalmatian art and architecture. Of Roman architecture only scattered fragments survive. These include a fine Corinthian column in the Piazza dell' Erbe and part of a Roman arch, which was incorporated by the Venetians in the Porta Marina when they rebuilt this section of the walls in the sixteenth century. An inscription records that the arch was erected by a Roman widow, Melia Anniana, in memory of her husband. The Museum, which is housed in the former church of S. Donato, has an interesting collection of Roman and pre-Roman antiquities.

The ancient church of S. Donato was erected in the ninth century on the foundations, and partly with the material, of a Roman temple. Its founder was Bishop Donato of Zara, who dedicated it to the Holy Trinity, but from the sixteenth century it has been known by his name. It is a round church after the type of S. Vitale at Ravenna, with two stories and three radiating apses. Adjoining it is the cathedral of S. Anastasia; originally a Byzantine edifice, it was almost completely rebuilt in the thirteenth century and dedicated in 1285. The façade, added in 1324, is the finest in Dalmatia and a curiously late example of Romanesque architecture. The cathedral has suffered considerable damage from bombing and the ancient baptistery is a heap of ruins. Among the treasures of the interior which have survived are the splendid fourteenth-century canopy over the high altar and the richly carved wooden choir-stalls dating from the fifteenth century. The fate of the polyptych by Carpaccio and other Venetian painters as well as that of the peculiarly rich treasury is unknown. The fifteenth-century campanile remained unfinished until 1892, when it was completed from the designs of Sir Thomas Graham-Jackson, who had made himself an authority on the history and architecture of Dalmatia. The most interesting church in Zara after the cathedral is S. Grisogono; dating from remote antiquity, it was rebuilt in the twelfth century and is distinguished by its extremely beautiful apses. Among other remarkable medieval churches is Sta.

Maria, with its campanile built by King Colman of Hungary in the twelfth century and a graceful Renaissance façade. S. Simeone is an early Renaissance building which owes its name and fame to Simeon, who held the infant Christ in his arms at the Presentation in the Temple. His body, it was believed, was brought to Zara in the thirteenth century, and in 1380 it was enclosed in a magnificent silver shrine given by Queen Elizabeth of Hungary, who visited Zara with her husband, King Louis, in 1371. This wonderful specimen of craftsmanship is among the chief artistic glories of Zara.

Domestic architecture of the fifteenth century is well represented by Casa Vovo with a charming interior court. Outstanding among sixteenth-century public buildings is the Loggia (1565), once the seat of the judges and the place where public edicts were promulgated and now the public library. Its architect was Gian Girolamo Sammicheli, who, according to Vasari, continued the work of his uncle Michele in Zara. Near it, in the Piazza dei Signori, is the Gran Guardia (1562) with the clock-tower above it. The lion of St. Mark below the clock was brought here in 1919 to replace the Austrian eagle torn down by the populace the year before. The Campo Cinque Pozzi is a raised stone-floored square containing five public wells erected by the younger Sammicheli in 1575. Near it is the Porta Terraferma (1543), an arch of Tuscan-Doric design, of which Michele Sammicheli was the architect. It is surmounted by a statue of S. Grisogono on horseback and above it again appears the Lion of St. Mark.

Industry

The territory of Zara is unable to produce sufficient food for its own needs, and is dependent on supplies from the neighbouring Yugoslav islands, Croat peasants and fishermen bringing their goods for sale in the Zara markets. Zara is the commercial centre for an area much larger than its enclave. The Italians declared it a free port and outside the Italian customs barrier. This exemption from heavy indirect taxation has contributed to the prosperity of Zara by reducing the cost of living, by encouraging the already existing industries, and in attracting new ones. Many of the industrial establishments, therefore, have developed since the Italian occupation. The oldest industry, which dates from 1730, is the manufacture of maraschino, a liqueur, made from wild cherries, *marasce*. These are grown on the coastal plain of Dalmatia and imported by ship from Šibenik and Split and elsewhere. About 66,000 gallons of the liqueur are made

annually, of which about 60 per cent. goes to Italy and 40 per cent. is exported throughout the world. The manufacture of cherry brandy is more recent in origin and on a much smaller scale, about 90 gallons being produced in 1932. Maraschino and cherry brandy are distilled by three large firms and by about ten much smaller ones.

The manufacture of insecticide from a small type of chrysanthemum, grown mainly in south Dalmatia, is also a speciality. This industry commenced in 1886, but has been considerably fostered by the Italians. Considerable quantities of insecticide powder are made annually, and much of it is exported, mainly to Hamburg. Recently insecticide concentrates have also been made.

The tobacco industry has developed since the Italian occupation, principally because the port is exempt from Italian customs and excise duties. There are four tobacco factories, the largest of which belongs to the Italian state monopoly. These factories use imported Bulgarian, Macedonian, Turkish, Greek, and Italian tobaccos. Cigarettes are the principal product (485,000 lb. in 1932), and they were mostly exported to Italy.

Next in importance is the fish-net factory, which has recently been enlarged. The greater part of its production was exported to foreign countries, and Italy only took 35 per cent. There are also two boat-building yards and a small sheet-iron works.

The most notable branch of the food industry is the manufacture of pasta, favoured by freedom from grain taxes. Six establishments, using imported grain milled mainly at Bari or Syracuse, manufacture pasta mostly for export to Italy. The chocolate factory, employing about 60 persons annually, used about 55,000 lb. of raw chocolate, the finished products being sent mainly to Italy.

Industries are for the most part concentrated in the new suburbs east of the harbour, but the smaller firms in the maraschino, insecticide, and tobacco industries are still in the old town.

The small fishing-fleet belonging to the town is very hampered by the restricted territorial waters of Zara, and trawling is forbidden in the Canale di Zara. The fish market of Zara is also supplied by Yugoslav fishermen, and sometimes the fishing-fleets of S. Benedetto del Tronto, Ancona, and Chioggia put in at Zara.

Description of Port

The main part of the port of Zara is in the northern of the two inlets intervening between the town and the mainland to the east. Access is by several deep-water passages between the many off-lying

islands. The one most generally used is some 20 miles to the north-west, the Prolaz Maknare, immediately south of Molat island, although traffic from the northern Adriatic can enter the inner roads 18 miles farther north-west by passing north of Premuda island. Both of these routes approach Zara along the Canale di Zadar (Zadarski Kanal). The immediate approaches to the port are not without danger from outlying shoals and reefs, but anchorage is available in either of the two bays north of the town, respectively north of Amika point and Skala point.

On the west side and some 1,000 yards from the head of the Zàra peninsula is the small double camber of La Fossa, about 750 feet long and 120 feet wide (p. 498). Quays extend from its entrance northwards right round the peninsula to a point on its east side opposite to their starting-point. Midway along the west side a mole, the Molo Vittorio Emanuele III, projects 250 feet at right angles to the shore, but both it and these west quays are very exposed. The eastern quays, while naturally sheltered, have been further protected by the Molo Porporella. This mole, slightly dog-legged, projects from the eastern shore of the inlet slightly inside the head of the peninsula. Its total length is about 530 feet, and the entrance to the inner harbour, between its head and the peninsula, is just over 200 feet wide, with depths of 42-48 feet.

The inside of the mole is quayed and so is the shore from its root to the Valle di Bora. This is a shallow cove on the landward side of the harbour, reserved for the navy, and near its entrance is the base for the seaplane services using the port. Its south side is quayed. To its south a quay extends, after an irregular projection near the entrance to the cove, as far as the Ponte del Littorio, the bridge which links the mainland and the peninsula midway along the inlet. Although the central swing span, which is 49 feet wide, allows ships to pass through the bridge, and the east shore is being reclaimed, this inner part of the inlet, the Valle dei Ghisi, is little used except by small craft.

Most quays on the peninsula are 5 feet high. That inside the Ponte del Littorio, the Riva S. Rocco, is 4 feet high, while those on the east side of the inner harbour are probably no more than 3 feet in height. The quays are wide, but entirely without facilities except for the Riva IV Novembre. This quay, which extends from opposite the Valle di Bora to the bridge, is the main commercial quay and has the only crane in the port.

Facilities. The Captain of the Port's office is on the north-west

corner of the peninsula, while the customs-house is behind the northern end of the Riva IV Novembre. The Health office is on the Riva Sanita, the quay opposite the Molo Porporella. The naval headquarters are on the head of the peninsula.

The crane on the Riva IV Novembre is a travelling crane, whilst a floating 3-ton sheer-legs is also available.

Small stocks of coal are maintained near the east end of the bridge. There is no bulk storage of oil, but small supplies are available. All quays are supplied with hydrants and are lit by electricity. A small slipway is located on the Valle di Bora.

	Name	Depth alongside (feet)	Length (feet)	Facilities, &c.
1	Vittorio Emanuele III (south)	8-10	1,840	West shore of town. Small craft, general cargo.
2	Molo Vittorio Emanuele III	..	..	West shore of town. Passengers, general cargo.
	SE. side . . .	10-18	250	..
	Head . . .	18	60	..
	NE. side . . .	10-18	250	..
3	Vittorio Emanuele III (north)	8-10	690	West shore of town. Small craft, general cargo.
4	Riva Derna . . .	18-24	380+440	North and NE. end of town. General cargo, fishing boats.
5	Riva Sanita . . .	20-24	770	NE. shore of town south of Riva Derna. General cargo, passengers.
6	Riva IV Novembre . .	24-30	700+440	Between Riva Sanita and Ponte del Littorio. General cargo; large ships.
7	Riva S. Rocco . . .	16-18	560+640	South of bridge on east of promontory. Fishing boats and small vessels.
8	Riva Cristoforo Colombo .	6-10	690+65+100	East side of harbour between east end of Ponte del Littorio and south shore of Valle di Bora. General cargo.
	Valle di Bora quays . .	10	150+420	South side of inlet. Used only by Italian navy.
9	Riva Barcagno . . .	6-10	550+165+65+115	Between Valle di Bora and root of Molo Porporella. General cargo.

Trade and Connexions. Apart from the considerable trade handled by local craft, which chiefly brought food to the town, the trade of Zara was largely intended to support the industries attracted by the declaration of the territory as a free zone, and to supply the large naval and military establishments necessitated by Fascist imperialist claims. Almost all the shipping services were subsidized, 90 per cent. being operated by Italian lines.

Statistics of shipping, passengers, and goods are as follows:

	1938	1939
Ships entered: number . . .	1,788	1,500
tonnage . . .	895,000	754,000
Ships cleared: number . . .	1,793	1,500
tonnage . . .	895,000	754,000
Goods loaded: tons . . .	37,000	31,000
landed: tons . . .	11,000	34,000
Passengers disembarked . . .	43,695	37,024
embarked . . .	44,147	36,114

There are sailings from Zara, daily to Ancona, twice weekly to Fiume (two itineraries), and to Pola and Trieste, and weekly to Obbrevazzo, to Pago, to Scardona, and to Sebenico. The town is a port of call on the following services: twice weekly, Venice to Gravosa; and, weekly, Venice to Dalmatia, Albania and Bari; Venice to the Piraeus and Rhodes; Venice to Bari; Fiume to Spalato and Gravosa; and Fiume to Spalato and Lagosta.

Communications

Communications are, except locally on the mainland, by sea. Two main roads, however, lead inland from Zara. The most important (137) goes to near Zemonik (Zemonico), where it branches. The first branch continues eastwards to Obrovac and then over the Bebian Alps northwards to Susāk and Fiume. The second branch leads southwards to Šibenik (Sebenico) and Spalato (Split). These two roads connect with the main Yugoslav road system. The other main road follows the coast from Zara to Biograd and Pakostane. Lesser roads lead over the frontier to (1) Nin (Nona; 135), (2) past Bocagnazzo (in Zara territory; 136) to near Ljubač, (3) Posedarija via Murvico (Murvizza) and Smilčić. Most of these roads radiate from the S. Giovanni road junction. There is no railway. The port between Molo Porporella and Ponte del Littorio was formerly used as an airport for seaplanes with services to Ancona, Trieste, and Brindisi. In Yugoslavia there is an aerodrome, 8 miles from Zara, at Zemonik (Zemonico).

CHAPTER XXIII

SARDINIA

SARDINIA, the next largest island of the Mediterranean after Sicily, forms with Corsica an island barrier delimiting the Tyrrhenian Sea on the western side and lying about half-way between the coast of Tuscany and Africa. From Africa, however, it is separated by an open and fairly deep channel 115 miles wide, whereas the presence of Corsica and other islands divides the northern channel so that its greatest width is only 21 miles between Capraia and Elba. The Corsican-Sardinian barrier serves to emphasize the severance of the eastern from the western Mediterranean by Italy and Sicily. Sardinia, the most remote part of the kingdom of Italy, has been politically associated with some part of the mainland for most of its history, except for a period of Aragonese rule from the fourteenth century to 1720, which has left considerable traces. Since 1720 the island has been in the possession of the house of Savoy, and the dukes of Savoy took the title of King of Sardinia until the kingdom was merged into the larger kingdom of Italy.

The island lies between latitude $41^{\circ} 16' N.$ at Point Falcone and $38^{\circ} 52' N.$ at Cape Teulada, latitudes which correspond roughly with those of Terracina and Catanzaro on the mainland. Cape Argentiera ($8^{\circ} 8' E.$), the westernmost point, lies roughly in the longitude of Imperia, and Cape Comino ($9^{\circ} 50' E.$), the easternmost, in that of Spezia. The main island is about 170 miles long, a little over 60 miles wide, and has an area of 9,202 sq. miles. The coastal islands account for another 106 sq. miles, and among them the largest are S. Antioco and S. Pietro in the south-west, Asinara in the north-west, and Maddalena, Caprera, and Tavolara in the north-east. The total length of the coast is about 830 miles, i.e. considerably more than the larger island of Sicily (680 miles).

Although Sardinia includes about 8 per cent. of the area of the whole kingdom, its resident population (1,034,206 in 1936) is only about 2.4 per cent. of the whole, and the average density of population is only 111 persons per sq. mile, compared with 360 for Italy as a whole and 710 for Campania. The mountainous Bolzano (II, p. 656) is the only mainland province to have a population density lower than the average for the whole island. This sparsity of the population of Sardinia offers a striking contrast to the densely peopled mainland.

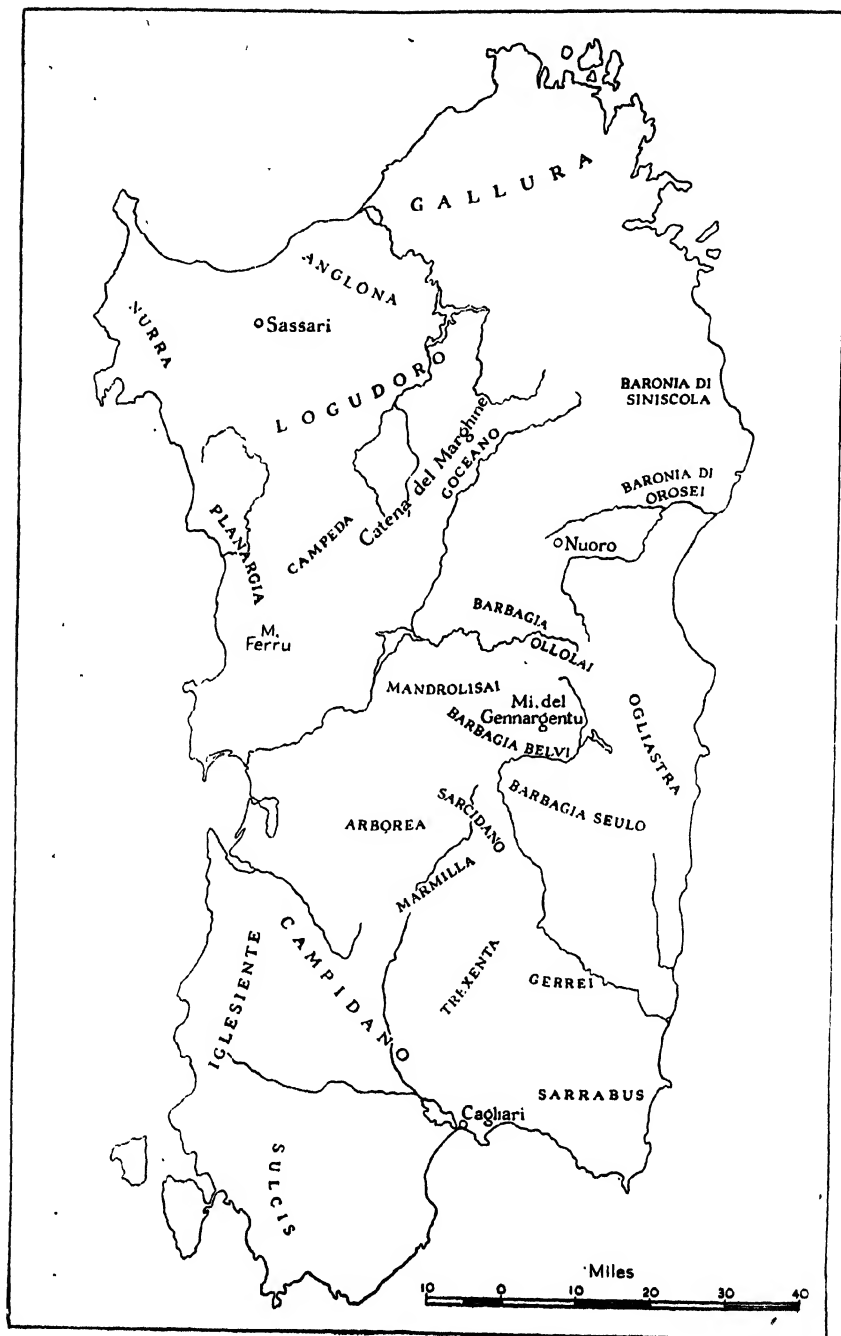


FIG. 43. *Regions of Sardinia*

The island comprises three administrative provinces, Sassari, Nuoro, and Cagliari, grouped into a compartment (Sardegna). Sardinia is, however, peculiarly rich in local district names, some of which are marked on Fig. 43. The boundaries of these districts are very imprecise. For example the name Sarrabus may refer strictly only to the coastal plains of the east coast from Muravera southwards, or more generally to the whole south-eastern granite country. The names Iglesiente and Sulcis, strictly speaking the northern and southern halves of the highland south-west of the Campidano, are both at times used to refer to the whole highland.

Sardinia differs from the Italian mainland in many aspects of her physical and human geography. The nature of the rocks, their structure, the type of relief, the lack of lakes and of earthquakes, the wealth of minerals, the sparse population, the dialects, and the peculiar prehistory all distinguish Sardinia from other parts of Italy. On the other hand, there are similarities. Many aspects of Sardinia, such as its general structural relationship to the mainland, its climate, its artistic contributions, its health services, and its administration have been described in Volumes I and II. In particular the administration has been assimilated to that of the mainland, although remoteness has had the natural consequence of tempering the execution of unpopular measures. A special office, the *Provveditorato alle Opere pubbliche*, was created to direct public works (mainly land reclamation) in all three provinces.

PHYSICAL DESCRIPTION

THE island is mainly mountainous, but with no clear ranges. Instead, there is a patchwork of rolling plateaux, with a few plains and hill lands. Recent folding of the crust has had little effect, but ancient folds have been planed down by ages of erosion and more recently uplifted into comparatively monotonous plateaux, separated by river valleys or faulted depressions. Other plateaux are formed from patches of more recent horizontal sediments and volcanic rocks. The description of the topography falls inevitably into that of a large number of these small regions, many of which have distinctive local names. They can, however, be grouped into four main divisions.

A narrow, low-lying plain, the *Campidano*, extending from the gulf of Cagliari north-north-west to the gulf of Oristano, cuts off a small south-western highland, the *Iglesiente*, from the much larger *Eastern Highlands*, which cover the whole eastern half of the island.

The *North-West* is mainly composed of recent volcanic rocks, but also includes some small sedimentary plains and the short hill range of the Nurra and Asinara island.

Although the relief of the island differs from that of the rest of Italy, many of the same landform types, described in Volume I (pp. 32-40), can be seen (Fig. 44). Some mainland types are absent: there are no glaciated highlands, moraines, nor fluvio-glacial gravels, although there are terraced alluvial deposits of similar age; there are no plains nor incised plateaux of volcanic ash and tuff, and no Pliocene plateaux and basins. On the other hand, there is one type not found on the mainland, namely the lava plateaux (I, p. 40). The basic lavas of Sardinia were highly fluid and spread out in thin sheets covering large areas of country and on cooling were traversed by many vertical joints. The denudation of these rocks by streams and weather produces a tabular landscape of many horizontal or nearly horizontal levels, large and small, corresponding with the surfaces of the lava-flows. These levels are separated by abrupt steps corresponding with the vertical joints, or by steep-sided river valleys. Such a landscape prevails over large areas of basalt and trachyte in the north-west, and also in more restricted areas on the north side of the gulf of Orosei.

GEOLOGY

Sardinia differs fundamentally from the mainland and from Sicily in being geologically an ancient country. Both rocks and structure are predominantly older than the mainland. Not only are there larger expanses of old, Primary rocks, covering about half the surface and forming the foundation of most of the rest, but many features of their structure were determined, not as on the mainland by the Alpine (Miocene) but by the Carbo-Permian mountain building (I, p. 24). The Calabrian peninsula, it is true, has many rocks of Primary age, but these have been incorporated by violent faulting into a young folded mountain range. With these geological peculiarities are connected Sardinia's comparative wealth in minerals and the rolling landscape of much of the country (Figs. 45, 48).

The geological affinities are rather with Corsica. There is a submarine connexion between the Corsican-Sardinian massif and the neighbouring islands, but Sardinia is separated by deep water from Sicily and Africa. Corsica and Sardinia form parts of a single range of mountains rising over 13,000 feet from the flat floor of the seas on either side. This range owes its present shape to faulting

and foundering in Alpine mountain-building times (I, p. 27), and represents, together with the oldest parts of Tuscany (Apuan Alps, &c.), the Maures and Esterel in France, and other areas, part of a former Tyrrhenian continent now broken up by faulting.

The oldest rocks of the island are the Cambrian (I, p. 24) slates, limestones, and dolomites of the south-western half of the Iglesiente and Sulcis, and include the principal metal mines. A variety of Silurian clays and some sandstones and small limestone beds were laid down later; these rocks now outcrop in the east of the Iglesiente, in the southern part of the Eastern Highlands (Gerrei and southern Barbagia), and in the Nurra. During Carboniferous times some anthracite-bearing shales and sandstones were deposited and are now preserved in hollows on the older rocks at Seui, Seulo, and Perdasdefogu in southern Barbagia. All these ancient rocks were involved in the folding of the great mountain-building movement of Carboniferous and Permian times. The rocks were folded, contorted; and raised up into a mountain range into the core of which great masses of granite were injected from below. The heat and pressure metamorphosed many of the pre-existing sedimentary rocks into crystalline schists. The Carbo-Permian granite now forms the surface of 30 per cent. of the whole island, including large parts of eastern Sardinia, especially the northern half and Sarrabus, and also parts of Iglesiente and the island of Asinara, and is probably, with its accompanying crystalline schists, the foundation of the remainder of Sardinia. Besides altering the Silurian and other rocks, the granite was connected with their mineralization. At the end of this mountain-building period Sardinia was part of a continent with mountain ranges running north to south, composed mainly of schists injected with granite which was only to emerge at the surface after ages of later erosion.

Rocks of Secondary age, although much less common than on the mainland, were probably laid down over the greater part of the east. Although now they have been mostly eroded away, some patches have been preserved: Triassic and Jurassic limestones in the Nurra hills; Jurassic sandstone covered by limestone in flat-topped masses known as *tacchi* in southern Barbagia, Ogliastra, and especially in the tableland of Sarcidano; Cretaceous limestone in the hills between the gulf of Orosei and Gennargentu, and the dolomite ridge of M. Albo a little farther north. These secondary rocks lie mostly unfolded and almost horizontally on the granite foundation.

The succeeding Tertiary period at first, during Eocene times,

witnessed the deposition of similar rocks: sandstones and limestones of Gerrei, sands, clays, and coals (I, p. 26) of the Sulcis coalfield. There followed, however, in the Oligocene, a period of extensive volcanic activity preliminary to the Miocene folding of the Alps and Apennines, which was accompanied by much faulting and subsidence and further vulcanicity. After this the Tyrrhenian continent was reduced to an archipelago in which Corsica and Sardinia were first separated. The Oligocene volcanoes covered extensive areas with trachytes and trachytic tuffs in the north-west (Anglona, parts of Logudoro, and the quadrilateral Porto Torres, Alghero, Bosa, Bonorva), the middle Tirso, and the islands of S. Pietro and S. Antioco with the neighbouring coast. Here manganese and copper ores were associated with these lavas. On the floor of the Miocene sea, which flooded the depressions between the remaining fragments of the old continent, a series of rocks were laid down along a zone from the gulf of Cagliari to the gulf of Asinara. These rocks were mainly limestones and marls, and yield the best soils in the island, especially near Sassari and Cagliari. In the Marmilla and Trexenta they are mainly marls, with coarse sandstones along the Campidano margin. In Pliocene times Sardinia was (unlike the mainland) mostly dry land, and volcanic activity broke out again and lasted into the Pleistocene. From this time date the great basalt flows of Macomer and Abbasanta, the smaller ones of Arborea and the gulf of Orosei, and the recent volcanic cones of Logudoro.

The Pleistocene glaciation did not affect Sardinia, but at this period the Campidano, the eastern Nurra, and several coastal plains were submerged and were gradually filled in with sands and silts, most of which are terraced as a result of slight changes in sea-level. These phenomena are not so striking as on the mainland, and the practical absence of earthquakes testifies to the greater stability of the island. The process of infilling is still continuing in the lagoons and shallow coastal waters of the gulfs.

The differing geological history of Sardinia from the mainland, the greater importance of Primary rocks, and the relative unimportance of Secondary and Tertiary sediments, means that hard consolidated schists, granites, and volcanic rocks occupy a relatively large area, while soft clays and unconsolidated sands are practically absent, except for Quaternary and Recent deposits near sea-level. Limestones, too, particularly massive Secondary limestones, are relatively scarce. Thus two of the most characteristic features of the mainland, the rugged limestone mountains, and the unstable but some-

times fertile sands and clays with badlands and landslips, are rare and strictly confined to certain districts (p. 526).

CLIMATE AND RIVERS

The climate, although typical of a Mediterranean island (I, pp. 406-432 and 438-439), differs from that of Sicily in having weaker local climatic contrasts owing to the moderate relief, and a short dry spell in winter which separates the wet season into two parts. The succession of seasons is somewhat irregular. In December and January there are weeks when the air is mild and the sky clear, but February has changeable temperatures. Early spring is rainy and the temperature remains relatively low in March, so that vegetation is not so forward as on the Riviera. It is only in April and May that the temperatures rise appreciably. In June the hot southern summer sets in quite suddenly with its three months drought. The autumn is relatively warm and the rains begin in October.

Owing to the small total rainfall, less than 40 inches everywhere except in the highest mountains, and less than 25 inches in all the lower ground (statistics and maps in I, Appendix VII, and pp. 438-439), and the scarcity of limestones and other water-bearing rocks, and the strongly marked drought in summer, even the largest rivers have an extreme regime and are practically dry at the end of the summer (Appendix III). The length and severity of the drought are greater in the south (southern Italy type, I, Fig. 5*B*) than the extreme north (central Italy type). The severity of floods and droughts has been made worse by deforestation, and remedies are now being sought in replanting (p. 588).

The courses of the rivers have been influenced by the widespread faulting, and they often run parallel to the coasts or to other relief features, which likewise are faulted in origin. The resulting river pattern is irregular, and the principal watershed is well east of the centre. The Tirso (93 miles) is the principal river and drains most of the middle of the island to the gulf of Oristano; the Flumendosa (113 miles) drains the southern Barbagia and Gerrei to the south-east; the Coghinas (65 miles) collects water from the Logudoro and the Terranova-Ozieri depression through a narrow valley to the north coast; the Flumini Mannu (47 miles) from the Sarcidano, Trexenta, and eastern Gerrei, joins with the Cixerri (26 miles) from the Iglesiente before emptying into the Cagliari lagoon. Shorter rivers drain the other coastal areas. There are no large areas of underground drainage.

There are no large lakes except coastal lagoons, known as *stagni* (I, p. 43), in the various silted coastal plains, and three large reservoirs (p. 601), one on each of the three largest rivers.

TOPOGRAPHY

Plains and high mountains are both uncommon in Sardinia, which is a country of plateaux at altitudes varying up to 3,300 feet. Of the whole area 38 per cent. lies between sea-level and 660 feet, 26 per cent. between 660 feet and 1,300 feet, and only 7 per cent. over 2,600 feet. The various plateaux, mountains, and plains cut each other off into a large number of small districts, between which communications are often poor.

The nucleus and basis of the whole island is formed of old rocks, much folded and repeatedly worn down to level surfaces, remnants of which persist to-day at many different altitudes. These old, mainly crystalline, rocks occupy the surface in the whole of the eastern half of the island, and in the Iglesiente and Nurra districts. Elsewhere they have been covered either by volcanic outpourings or by more recent sediments, occupying most of the rest of the area and likewise preserving a number of level surfaces (Fig. 44).

The North-West

The bulk of the volcanic rocks are found in the north-western quarter of the island, where the relief is broken up, even more than usual, into a number of small units. Apart from the M. Ferru and the Nurra hills, these consist of plateaux or high plains in varying states of preservation and dissection.

In the extreme north-west is the Nurra range of hills rising to 1,522 feet (464 m.) in M. Forte, composed of old rocks folded in an almost north-to-south direction and with some mineral wealth (Argentiera mine). There are two parallel lines of isolated, scrub-covered hills, one of Silurian schists from Cape Caccia, keeping close to the coast to M. San Giusta (824 ft., 251 m.) and continued through the Stintino peninsula into the crystalline Asinara island (19 sq. miles; Punta della Scomunica, 1,339 ft.); the other of limestones from Point Giglio to M. Alvaro (1,122 ft.). East of these hills, the Nurra plain of recent sands, covered with winter grazing, stretches between the gulf of Alghero and Porto Torres, and as far east as Olmedo and a point half-way between Porto Torres and Sassari. This plain rises to about 250 feet near its centre, but is interrupted by a few small hills. Eastward it rises gradually into the productive and well-

populated limestone tableland, formed by an outcrop of Miocene rocks, within a radius of 5 miles of Sassari. From the coast up to about 1,300 feet the country is thickly dotted with olive groves, normally protected by stone walls and frequently sheltering small houses. The Mannu, Mascari, and Oltava streams flow through steep-sided valleys between the tablelands which rise eastwards from about 160 feet on the edge of the Nurra to the higher and more dissected plateaux of Anglona. Anglona extends as far east as the lower F. Coghinas which separates it from the granites of Gallura (p. 522), and as far south as Ploaghe and the depression followed by the Sassari-Ozieri railway. The trachyte lavas and tuffs of Anglona are mixed with Miocene marls and rise to 2,516 feet (767 m.) in a former crater near Osilo; but for the most part lie at lower levels (e.g. about 1,150 ft. east of Chiaramonti, or 1,800-1,300 north of Nulvi), and are without marked relief except for the deep valleys. The lower Coghinas valley is deep and narrow and has enabled the building of the dam which has caused the flooding of a large area of the lowlands in the Terranova-Ozieri depression. Near the mouth of the river the valley is wide, low, and often marshy.

South of Anglona is the district of Logudoro, where marls are interspersed with remnants of old lava-flows, forming steep-sided hills, and more recent volcanic cones, which are especially frequent along a line from Ploaghe to Bonorva. This is a district of small plains and hills which in the east includes the larger plain of the upper Coghinas, or Campo d'Ozieri. This slopes down from about 1,000 feet near Ardara to 550 on the shores of the Coghinas reservoir, and forms the westernmost part of a long depressed zone extending through the granite hills to Terranova (p. 522). The Campo d'Ozieri is sparsely inhabited and is mostly rough grazing land; it has low, broad hills rising above the flood plain. The hillier parts of Logudoro to west and south are more productive and more thickly peopled. Towards the south and west the Logudoro mingles with the lava plateaux which occupy most of the rest of the north-western district. In both directions the plateaux become larger and higher, and towards the south more nearly level. To the south-west of Ittiri and of the R. Mannu di Porto Torres the lava-flows are much broken up and incised by tributaries of that river and of the upper F. Temo. Beyond the broad valley of the Temo they rise steadily towards the coast to heights of 2,300 feet, from which there is a precipitous descent to the coast between Alghero and Bosa. To the south the broken Logudoro country penetrates as far as

Bonorva. Small, steep hills enclose a few plains, the largest of which, the Campu Giavesu (3 miles by 1; 1,345 ft.) north-west of Giave, and the Campu di Olta (4 miles by 4; 1,148 ft.), including the small reclaimed area of S. Lucia di Bonorva, west of Giave, are drained by the upper Coghinas (Mannu); numerous villages crown the smaller hills and hill-sides, and the main railway passes through these plains. Immediately south of Bonorva a clear, roughly east-to-west escarpment marks the edge of a quite different landscape of wide plateaux with a few deeply incised valleys and almost flat surfaces. There are two groups of these lava plateaux, one higher group between Bonorva and Macomer, and a lower one between Macomer and the Tirso, separated by a long, straight scarp running north-east through Macomer itself. Towards the south-west these lava-flows merge into the vaguely conical extinct volcano of M. Ferru. The northern plateaux are broken up chiefly by the R. Mannu de Planu de Murtas, and the largest units are the Campeda between Bonorva and Macomer and the Planu de Murtas to the north-west. The scarp at Bonorva is clear cut and rises about 1,000 feet to a level of 2,100 to 2,300 feet. This level is preserved southwards across the Campeda till the scarp at Macomer falls to the Abbasanta plateau. Towards the east the Campeda rises gently and the basalts rest on the granites of the Marghine chain of mountains (p. 523), which forms a south-east-facing barrier continuous with the Macomer scarp. The Abbasanta plateau, which is at a height of about 1,300 to 1,000 feet at the foot of the scarp, measures about 25 miles by 9, and dips gently south-east from the scarp towards the Tirso. This river is deeply incised (down to near sea-level) where it breaks through the trachytes to the Campidano. The plateau, which has here declined to about 500 feet, drops abruptly to the Campidano (p. 528) at a height of a few feet above sea-level. The volcanic rocks reappear, much dissected, on the far side of the Tirso, where they extend towards Laconi, and again in M. Arci and other places along the eastern margin of the Campidano. Towards the west of the Campeda the basalt plateaux are dissected by the steep-sided valleys of the Temo and its affluents, but rise in the south-west to the low conical mass of M. Ferru. This extinct volcanic cone, comparable in size though not in height with Etna, has been dissected by radial streams into a number of separate peaks, of which M. Urtigu (3,445 ft., 1,050 m.) is the highest. The southern slopes towards the Campidano are closely cultivated and thickly populated. In contrast, the higher Campeda is mostly deserted and covered with rough

grazing and macchia. The lower Abbasanta plateau is dotted with a few big villages at large intervals. Most of it is divided up by dark basalt walls into enclosures (*tanche*, p. 584), which near the villages are small and cultivated but farther away are much larger and more wooded, especially in the south near Paulilatino and Ghilarza. *Nuraghi* (p. 559) are particularly common on these basalt plateaux, and show that they were comparatively densely populated in prehistoric times. Macomer is the most important of a line of villages at the scarp foot and controls the principal gap between M. Ferru and the Marghine range. The Macomer gap, a small valley cut in the scarp, is used by the main north-to-south road and railway and also by an east-to-west road and the railway from Nuoro to Bosa.

The Eastern Highlands

The core and main part of the eastern half of Sardinia is composed of mountains of hard, crystalline rocks—granites and schists. To the west of these rocks in the northern half of the country the trachyte lavas and tuffs lie directly on the old rocks and there is no transitional landscape. In the south, however, a broad marginal zone of hills of recent marls and sandstones, with some volcanic patches, intervenes between the old rocks and the recent alluvium of the Campidano to the west. On the eastern side and in the north and south the granites and schists for the most part reach the sea (Fig. 45), except for small coastal plains, of which the chief are at Terranova, Posada, Tortoli, south of Bari Sardo, Muravera, north of Cape Ferrato at S. Priamo and at Quartu S. Elena; the whole of the gulf of Orosei forms a more important exception, for here Secondary lime-stones and basalt flows intervene between the Nuoro granite and the sea.

These granites and schists do not, however, form a continuous range of mountains. The central and culminating mountains of Gennargentu are bordered on their northern side by a series of great granite plateaux which extend as far as the north-east to south-west Terranova-Ozieri depression, beyond which again lies the more rugged granite highland of Gallura. To the south of Gennargentu the granites are confined to the hills near the coast, whilst inland there is a region of schists and slates much dissected and capped here and there by flat-topped limestone blocks. Finally south of the large and hilly basin of the middle and lower Flumendosa the granites reappear in the higher mountains of Sarrabus in the extreme south-east.

Gallura, the very north of Sardinia, is delimited on the west by

the F. Coghinas, below the reservoir, and on the south by the Terranova-Ozieri depression, which opens eastward into the Terranova gulf, with its surrounding coastal plain. Gallura is very similar in appearance to southern Corsica, from which it is separated by less than 8 miles of water in the strait of Bonifaccio. The eastern coast of Gallura, like western Corsica and the southern side of the gulf of Terranova, has a highly indented, *ria* coastline, reminiscent of Brittany or Kerry; the naval base of Maddalena derives advantage from these indentations. Of the twenty islands off Gallura only Caprera, Garibaldi's retreat (6 sq. miles), La Maddalena (8 sq. miles), Razzoli (0.6 sq. mile), S. Maria (0.8 sq. mile), S. Stefano (1.2 sq. miles), and Spargi (1.6 sq. miles) are inhabited (p. 535). Gallura is entirely composed of granite, which forms wide, open stretches of moorland rising to jagged hills and mountains, highest along its southern edge, where the Mi. di Limbara (4,459 ft., 1,359 m.) and Mi. Ultana (2,576 ft., 785 m.) tower above the Terranova-Ozieri depression. Apart from these mountains Gallura is a country of ridge and valley, mainly alined south-west to north-east and ending in coastal promontories and indentations. The principal summits are arranged in a horseshoe around the Liscia basin, which opens to the north-east. The Mi. Limbara and Ultana form the southern limb of this ring of hills within which lie the principal villages, Tempio Pausania, Calangianus, Luras, Nuchis, and Aggius. Gallura is renowned for its cork-oak woods, which are particularly frequent in the south (Fig. 47), and in this direction extend beyond the district. Tempio Pausania is the centre of the industry. Scattered oakwoods and small groups of houses give this portion of the island a distinctive appearance.

South of Gallura the faulted depression followed by the main railway line from Terranova rises to a watershed of about 1,000 feet near Monti. The northern wall is often rugged and high, but the southern is more regular. There are scattered sandy deposits on the floor of the depression and especially at either end. Large villages are few, but there are many scattered buildings.

The southern side of the trench rises to the northernmost of the great granite plateaux of eastern Sardinia, the Budduso and Ala dei Sardi plateau, at roughly 2,300 to 2,800 feet. All of the plateaux are mainly covered with *macchia* and rock-heath (p. 552), with scattered trees in valleys and even woods in the remoter places. On the Budduso-Ala plateau the shallow upper valleys of the Tirso and the Oschiri are scarcely below the general level, above which a very few rounded

summits rise to about 3,000 feet. Most of these summits occur near the northern edge along a north-east to south-west line which is continued to the south-west of Pattada and the Oschiri valley by the Marghine chain, a narrow, faulted ridge of granite and schist between the upper Coghinas lowlands on the north-west and the middle Tirso basin (Goceano) on the south-east. The north-western slope of the Marghine chain is dissected and comparatively gentle; the south-eastern faulted edge is steep and high, and is continuous with the Macomer basalt scarp (p. 520). The Marghine mountains rise to 4,131 feet (1,259 m.) in M. Rasu, near Bono, and above 3,000 feet throughout; there is no passage through them between Macomer and Pattada, where road 128 and a railway pass through to Ozieri. Along the foot of this scarp is a string of large villages of which Bono is the biggest. Towards the coast on the north-east, the Ala dei Sardi plateau is broken up into small fragments about 2,600 feet high by short streams which flow down to the small coastal plains on the south shore of the gulf of Terranova, at S. Teodora d'Ovidde, Tanaunella, and Posada. Coastal indentations like those of Gallura continue as far south as Cape Coda Cavallo. Molarra ($1\frac{1}{4}$ sq. miles) and Tavolara ($2\frac{1}{4}$ sq. miles), a peculiar ridge rising to 1,850 feet (564 m.) are the only inhabited islands.

To the south the Budduso plateau is continued without interruption into that of Bitti and Nule, which, in the triangle between Bitti, Benetutti, and Osidda, is the most level and featureless of them all (2,300–2,450 ft.; 10 miles by 7). South of the deeply incised R. Mannu the plateau continues at about the same level, but rather more cut up, to the deep valleys of the Liscoi (Nordole) and Isalle rivers, which, flowing in opposite directions, cut off the northern group of plateaux from that of Nuoro farther south still. A number of towns or large villages mark the edges of the Bitti–Nule plateau. On the west there is an abrupt drop to the Tirso, which immediately below Osidda flows in a deep, narrow valley, but after Benetutti in an open basin. The west side of this is floored by recent deposits laid down by short scarp-face streams from the Marghine chain and slopes gently up to its foot. In the east the Bitti plateau drops steeply to the Mannu (Posada) valley, east again of which the peculiar, long, narrow, but level, dolomite ridge of M. Albo (3,698 ft., 1,127 m.) extends from south-west to north-east between Lula and Siniscola. Siniscola lies on the edge of another small, river-mouth plain, and to the south-east of the Siniscola river the granites reappear and rise to 2,831 feet (863 m.) before reaching the sea at Cape Comino.

The westward-flowing Liscoi and the eastward-flowing Isalle and Cedrino rivers offer a comparatively low passage between the high plateaux used by road 129. The gap is guarded by the town of Nuoro, which stands on a plateau above the narrow valley of a tributary of the Cedrino 600 feet below. Between the Isalle and the Cedrino an east-to-west ridge culminates in M. Ortobene (3,133 ft., 955 m.), which dominates the town from the far side of the valley. South and south-west of Nuoro the granite plateaux (2,130-2,950 ft.) continue into the northern Barbagia (Barbagia Ollolai) until south of Fonni they rise to the mountains of Gennargentu. Although the landscape is open the plateaux are by no means flat. Rounded ridges and summits are separated by valleys, some of which are deeply incised, particularly those of the Tirso tributaries, the Taloro and Tino. In the west these plateaux also fall steeply along a line marked by the villages of Oniferi, Orani, Sarule, and Olzai to the open basin of the Tirso above its gorge and the reservoir. South of the Taloro in the Mandrolisai district, the plateau, much dissected, extends farther west to the Tirso itself. To the south of Fonni, which stands at 3,280 feet, the Gennargentu dome-like mass slopes up fairly gradually in long radial ridges of granite and schist to the twin summits of Bruncu Spina (6,001 ft., 1,829 m.) and Punta La Marmora (6,018 ft., 1,834 m.). Eastwards the rolling granite country does not extend beyond a line drawn south through Oliena. Between this line and the gulf of Orosei the country is of two types. In the north round Dorgali dissected and weathered lava-flows, small-scale copies of the Macomer country (p. 520), form fairly low, flat-topped hills. Elsewhere as far south as a line passing through Baunei and Urzulei the rock is limestone, fretted into long, comparatively flat-topped blocks or ridges with steep sides, and arranged in lines nearly parallel with the coast; e.g. the long, precipitous scarp starting on the west bank of the R. Flumineddu near Dorgali and stretching for 13 miles south through M. Oddeu (3,445 ft.), Costa Silana, and M. su Nercone (4,144 ft.) to Urzulei. The mountains are wild and rugged and higher than the granite plateau to the west, and the coast is high and cliffed with no coastal lowlands. In the lower Cedrino valley recent deposits form a small lowland to the west of Dorgali, cut off by the limestone M. Tuttavista (2,641 ft., 805 m.) from the Orosei coastal plain. This comparatively low-lying district is well cultivated and known as the Baronìa d'Orosei.

The southern and western slopes of the Gennargentu, the Barbagia Belvì, as far south as the east-to-west portion of the upper

Flumendosa, consists like the northern Barbagia of rounded but well-defined ridges radiating from the centre. At these altitudes of about 3,000 feet Mediterranean trees begin to disappear, and in the more remote valleys remnants of deciduous oakwood persist. In the valleys of Tonara and Desulo large chestnut woods extend up to over 3,600 feet. The ridges are mostly bare, but oaks grow thickly in the narrow valleys. The inhabitants of the villages which line the west side of the massif especially (e.g. Ovodda, Tonara, Desulo, and Aritzo), depend almost entirely on their large flocks.

Most of the rivers flowing south and west are deeply incised into the schists and many valleys have precipitous sides, as has the east-to-west portion of the Flumendosa valley which collects all the southward drainage. The uppermost valley of the Flumendosa, however, which drains the south-east part of the Gennargentu mass, is a high shallow basin at a level of about 2,800 feet, from which the river escapes into its east-to-west gorge. A reservoir has been constructed in this basin, which communicates by low cols at Villagrande Strisaili and at Arzana station with the coastal district of Ogliastro.

West of Gennargentu the Araxisi river collects the westward-flowing streams and continues in a deep and narrow valley through the lower plateaux (1,300 to 1,600 ft.) of granite and schists which form the southward continuation of the higher Mandrolisai (p. 524). These merge finally into the hilly and varied Arborea country (p. 527).

South of the east-to-west portion of the Flumendosa and of Laconi the Barbagia Seulo, including Sarcidano and the country as far south as Mandas and Perdasdefogu, has a foundation of schists and slates with granites near the coast; superimposed on this foundation are patches of horizontally bedded limestone, which form steep-sided, very flat-topped mountains known as *tacchi* or *toneri*. Some of these resemble gigantic castles, with walls, towers, and battlements; some are large (Taccu de Sadali, about 2,600 ft.; 3 miles by 5), others are quite small. Sarcidano, between Laconi and Villanova Tulo, is the largest of these plateaux (about 10 miles by 6), and slopes gently from about 2,600 feet immediately overlooking the west bank of the Flumendosa to about 1,600 feet on the south-west side near Nurallao and Isili. Other limestone mountains occur as far east as Jerzu and Tertenia. In the central part of the Barbagia Seulo, however, the slates rise higher than the limestone table mountains and culminate in M. Santa Vittoria (4,331 ft.; 1,212 m.). The Flumendosa and its tributaries flow roughly from north to south

in steep-sided gorges sometimes 1,300 to 1,600 feet below the plateau surfaces. Near Gadoni the Flumendosa makes a right-angled turn to the south, but its lower valley is continued northward by smaller valleys past Aritzo, Desulo, and Tonara. This southern Barbagia is the principal area in Sardinia subject to landslides. They occur in places where the granite is covered by a layer of sedimentary rocks or alluvial deposits. The winter rain penetrates into and lubricates the sedimentary surface layer, which in favourable circumstances may move bodily downhill; *lame*, areas subject to oft-repeated small movements, also occur (I, p. 490). The region affected includes the Gennargentu, Barbagia, and Ogliastra; the principal localities subject to landslides are Tonara, Desulo, Belvi, Aritzo, Seui, Ussassai, Gairo, Osini, Jerzu, Talana, and Baunei.

To the west of Laconi and Mandas the schists and limestones of the Barbagia Seulo give place to more recent marls, sandstones, and trachytes with some scattered basalt patches (p. 527). To the east the Barbagia is limited by the long, tectonic valley stretching south for 30 miles from the Flumendosa reservoir past Gairo Nuoro, through the upper Pelau and the Pardu to the Quirra valley. East of this deserted through-valley, which is made use of by road 125 and the railway to Jerzu, the granite hills are uninterrupted and comprise two distinct districts. North of the mouth of the Pelau and of Bari Sardo as far as Baunei, where the Orosei limestones begin, is Ogliastra, a fertile amphitheatre of hills centred on Lanusei and Tortoli and ringed about by higher mountains (over 3,900 ft. in the west and over 2,600 ft. in the north and south). Numerous streams from the mountains water a luxuriant growth of Mediterranean crops—chestnuts, olives, fruit trees, and vines. Some reclamation of the marshy Tortoli-Lotzorai coastal plain has been completed. South of Ogliastra a partly wooded granite ridge (M. de Feirru, 2,871 ft.) extends due south as far as the small coastal plain at the mouth of the Quirra. The coast is high and deserted.

South of Mandas and Perdasdefogu the landscape associated with the name of Gerrei extends southwards until the reappearance of the granite in Sarrabus along a line from the mouth of the Flumendosa to Sinnai. Gerrei is lower than Barbagia (M. Ixi, 2,753 ft., 839 m.), except in the extreme south (Punta Serpeddi, 3,507 ft., 1,069 m.), but like Barbagia Seulo is predominantly composed of slates and other schistose rocks. In Gerrei these are covered in patches with more recent limestones (Eocene), which also form steep-sided

tablelands, but at a lower altitude than the older limestones farther north in Barbagia. The largest limestone block occupies, with outlying patches, about half the area between the R. S. Giorgio and the lower Flumendosa, including the remarkably flat plateau (9 miles by 4) at about 1,650 feet which is dominated by the conical M. Cardiga (2,218 ft., 676 m.). Gerrei as a whole and apart from these limestone patches is highly dissected and abounds in steep slopes and occasional gorges such as that of the Flumineddu, over 600 feet deep, to the south-east of Escalaplano. The hills, however, have mostly flattened or rounded summits about 1,640 to 2,300 feet high. In the east the slates and schists reach the coast, and here are three small coastal plains at the mouths of the Quirra (p. 539), Flumendosa (Muravera), and Picocca (S. Priamo). Gerrei is but sparsely populated, especially in the east and south, where some forests remain.

Sarrabus in the south-east of the island is a dome-like granite region, largely uninhabited and clothed in parts with a thick growth of holm oak and some pine. The granite mass is highly dissected by radial streams with narrow valleys, and the rounded ridges culminate in M. Sette Fraris (3,357 ft., 1,023 m.) near the centre. Road 125 crosses Sarrabus by means of the Longu valley, a low pass (673 ft.), and the gloomy gorges of the Picocca. In the east there is lower country with small marshy coastal plains, and hills rising only to 1,400 feet.

Along the western margin of the southern part of the Eastern Highlands (Mandrolisai, Sarcidano, Gerrei, and Sarrabus) is a hilly zone, varying from about 8 miles in width in the south to nearly 20 in the north, and mainly composed of Miocene marls and calcareous sandstones, with occasional small granite outcrops and larger patches of basalt and trachyte. The recent volcanic rocks are mainly found along the edge of the Campidano plain, and in Arborea, the northern part of the zone, where they merge into the volcanic tablelands beyond the Tirso valley. The eastern boundary of this zone, which embraces the districts of Arborea, Marmilla, and Trexenta, roughly follows the railway from Laconi through Mandas to Cagliari. Except for some of the areas of volcanic rock the hills are rounded and the valleys open. Population density is moderate for Sardinia and, except near the numerous villages, trees are few, though the fields are enclosed by hedges, often of prickly pear. Of the volcanic hills on the Campidano margin M. Arci (2,664 ft.) is the only large one. Among the flat-topped basalt patches, known as *giare*, two are noteworthy. The first is the Planu

sa Giara or Giara di Genoni (to the north-west of Nuragus), a remarkably flat-topped eminence with a surface (at about 1,900 ft.) marshy in parts, measuring 7 miles long by 3 miles broad, surrounded on all sides by a precipice about 30 feet high, below which a gentler gradient leads down another 900 feet. The top is used almost exclusively as a horse pasture. About 6 miles farther east the smaller but similar Giara di Serri (about 1,250 ft. high, and 2 miles by 1) is partly wooded. Both are girdled by a ring of villages. North of M. Arci and the Planu sa Giara trachyte, basalt, and granite plateaux dip gently or in steps towards the Tirso valley, and become more highly dissected as they approach the plain and the river.

Campidano

The only considerable plain in Sardinia stretches for about 60 miles north-north-west from the gulf of Cagliari to that of Oristano, and around Oristano itself spreads eastward as far as M. Ferru and the Abbasanta plateau. The edges of the plain, marked by the occasional traces of former volcanic outbursts, are almost straight, except for the bulge near Oristano. The 9-mile-wide floor of the plain is nearly flat, rising to an indistinct and formerly marshy watershed at about 260 feet near Gavino Monreale. The floor is composed of soft sands and gravels, and rises along the margins to as much as 600 feet. The western edge, formed by the Iglesiente, is divided into two by the similar Cixerri valley and is much steeper and higher than the eastern, which is marked by road 131 as far north as Uras. Along these margins are remnants of terraces composed of coarser material, which at Cagliari are at heights of about 230, 330, and 660 feet above sea-level. The Campidano soils are productive, but the low rainfall and danger of malaria restrict population and agriculture. Most of the large villages are strung at intervals along the edges, though some are near the centre. Each village is surrounded by 'extensively' cultivated fields and grazing, together with an inner ring of gardens and orchards divided by thick prickly-pear hedges. Scattered dwellings are absent. The plain is almost completely treeless except for the fruit and olive trees and hedges near the villages; rough grazing and poor, low scrub cover the whole of the rest of the landscape, with occasional cereal fields (p. 582). At the seaward ends are lagoons; those of Cagliari are largely converted into salt-pans, and those round the gulf of Oristano have in part already been drained. Here is the reclaimed area of Terralba around the new town of Mussolinia (p. 617). To the east of Cagliari and between Oristano and the slopes of M. Ferru are

the two most densely populated districts and the most intensive agriculture. A few islands of slightly older rocks and basalts between Cape Mannu and Cape S. Marco have been joined to the mainland by the alluvium of the Tirso and streams from M. Ferru.

Iglesiente

This twin mass of hills is cut off by the Campidano from the rest of the island. It bears a great resemblance in relief and geology to the Eastern Highlands, being composed also of ancient Primary sediments, and granites, but has patches of Eocene clay and sands in the south-west, and recent volcanic rocks (trachyte) in the extreme north, near Pula in the south, and in the islands of S. Pietro and S. Antioco. Several forested areas in the north and a few small ones in the south remain; otherwise low *macchia* and rock heath cover the hill-sides. This old hill-mass is divided into two parts by the broad, flat, faulted Cixerri valley.

To the north of the Cixerri valley old hard rocks form a compact and rugged massif (the *Iglesiente* in the narrower sense) wherein are preserved widespread but small remains of old level surfaces at roughly 1,000, 1,300–1,475, and 3,300 feet. M. Linas rises above the last of these to 4,055 feet (1,236 m.). The general level declines gently westward. Farther north there is a rather lower area (about 1,300 ft.) extending from the lower Mannu di Fluminimaggiore to Guspini. North of this corridor recent volcanic rocks rise again to 2,576 feet (785 m.) in M. Arcentu. The edges of the *Iglesiente* drop sharply to the Campidano and the Cixerri valley, and in the west to the sea. The coast from the basalt Cape Frasca to Nebida is high and deserted, except for mines and mineral ports.

The Cixerri valley, which extends westwards to within 7 miles of the coast, resembles the Campidano, of which it is an offshoot, and is about 4 miles wide. To the south lies the larger but lower massif of Sulcis, highest in the east and opening out to valleys and lowlands along the west coast. The mountains form a horseshoe on the north, east, and south-east sides of the Palmas valley, which is made largely of Eocene sands and clays. An east-to-west ridge in the north (M. Orri, 2,372 ft., 723 m.) is separated by a valley, followed by the Santadi–Siliqua railway, from the higher Caravius (3,662 ft., 1,116 m.) group in the east; along the south-east side are the Mi. di Capoterra (Punta Maxia, 3,337 ft., 1,017 m.). Along the west coast are comparatively low hills up to 300 feet high and numerous coastal plains, which are almost continuous (Portoscuso, Palmas, Porto Pino,

Teulada, Chia, Pula). Sand-dunes, marshes, reclaimed areas, and poor grazing land alternate in this coastal area; trees are few.

The mountains immediately north of Iglesias, the small hill-mass which blocks the western end of the Cixerri valley (M. Barega, 1,493 ft., 455 m.), and the whole hilly basin of the Palmas river, are comparatively densely populated. The new coal-mining settlement of Carbonia (including the former commune of Suergiu) lies in a small inland plain near Serbariu. Metal and, in Sulcis, coal mines are numerous; narrow-gauge railways connect the mines with the ports.

Off the coast the two similar trachyte islands of S. Pietro and S. Antioco consist of low hills, but have few lowlands, while the coasts are mostly cliffed. Except for a few olive and oak woods trees are absent. The population of each is concentrated on the east side facing Sardinia. S. Pietro (6 miles by 4; 19 sq. miles) rises to 692 feet, and has a narrow lowland strip on the east side in the centre of which is Carloforte. S. Antioco (11 miles by 6; 42 sq. miles; Perdas de Fogu, 889 ft., 271 m.) is connected to the mainland by a sandbar carrying road and railway, and has lowlands on the north near S. Antioco and Calasetta.

COASTS

In the following account the coast of Sardinia, which covers a distance of about 830 statute miles, is divided into four main sections: the north coast and off-lying islands from Cape Falcone to Cape Ferro; the east coast from Cape Ferro to Cape Carbonara; the south coast and off-lying islands from Cape Carbonara to Cape Teulada; and the west coast from Cape Teulada to Cape Falcone, including the island of Asinara. Only the minor ports are described since the larger ports (marked by an asterisk) are discussed in detail on pp. 619-642. Distances along the coast are given in nautical miles and distances inland in statute miles.

North Coast

The north coast of Sardinia consists of two contrasting parts, the beaches of the gulf of Asinara in the west and the island-fringed rocky shore of Gallura in the east. Porto Torres, the only large port, and Castel Sardo, the only sizeable coastal settlement, are both in the west. Main roads (131, 134) come to the coast at these points and also at S. Teresa (133-*bis*) and Palau (133) in the north-east. Elsewhere, however, access inland is not easy, since many of the low beaches of

the west are backed by marshes or lagoons and the high shores of the east rise sharply to mountainous country.

Cape Falcone to Cape Monte di Fava. A rocky, indented coast, rising in parts to over 300 feet within a few hundred yards of the sea, stretches from Cape Falcone to Torre delle Saline, about 4 miles to the south-south-east. The only landing-places are at Stintino and Tonnara Saline. The former is a large fishing-village of about 700 inhabitants, built on a promontory about 500 yards long by 200 yards wide. At its southern end a jetty extends 90 feet into a small creek and a smaller jetty has been built nearly parallel to the first but about 80 yards north-west of it. From the landward end of the village a narrow road leads $1\frac{1}{4}$ miles south to Tonnara Saline, a tunny-fishing establishment. Here the landing-place is a small cove, about 150 yards wide and protected on its north side by a small breakwater. A wharf on the west side of the cove serves a fish factory which stands amid walled fields. A narrow road from Stintino passes within a few hundred yards of this building on its way south to Porto Torres ($16\frac{3}{4}$ miles).

From Torre delle Saline as far as Point Pedras de Fogu, 21 miles eastward, the coast is for the most part low and sandy and merges inland into marshes, salt-water lagoons, and in the east into sand-dunes. The four largest lagoons, or *stagni*, to the west of Porto Torres are the Stagni di Casariccio, Pozzinosi, Pilo, and Gerano, all of which are connected to the sea by narrow drainage channels. On their landward side lies a strip of marsh or of semi-reclaimed land which improves inland to form cultivated fields and meadows dotted at wide intervals with isolated homesteads and small scrub-clad hillocks. The Stintino-Porto Torres road keeps between $1\frac{1}{2}$ and 3 miles from the shore.

Within $3\frac{1}{2}$ miles of Porto Torres* the sandy beach gives way to a rocky coast which continues for a similar distance east of the port. Thence a low sandy coastline, known as the Marina di Sorso, stretches to Point Pedras de Fogu. The central part of this 9-mile beach is backed by the Stagno di Platamona, a lagoon about 2,500 yards long, girt with sand-dunes and connected at its western end to the sea by a narrow drainage channel. Low but extensive sand-dunes back all this beach except in its north-eastern part, where for $2\frac{1}{2}$ miles meadows and cultivated fields approach close to the shore. Although the Marina di Sorso is the northern edge of a broad, well-cultivated plain that extends southwards to the region of Alghero, its inland connexions are poor, the nearest route being a narrow road (from

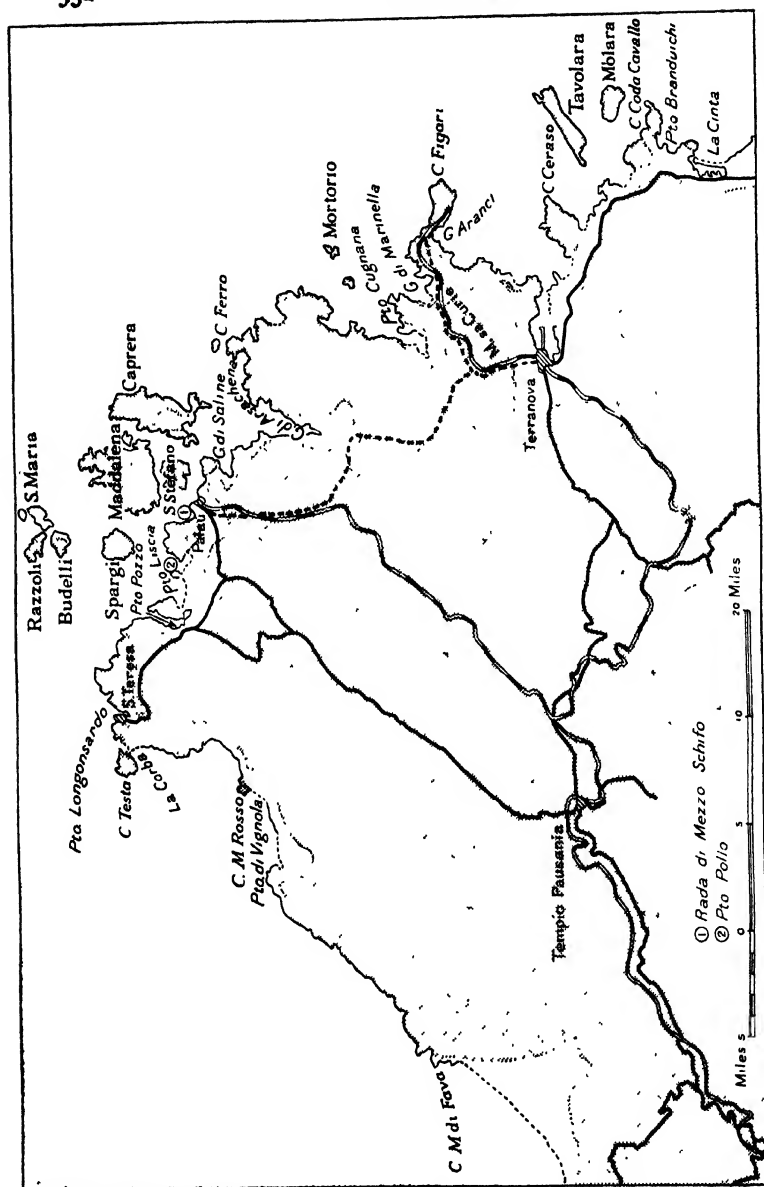


FIG. 46. Coast of north-eastern Sardinia: rough or high land is stippled, rugged, rocky, or cliffed coast is marked by a broken line and beaches by a continuous line; main roads are denoted by solid lines, secondary roads by broken, and railways by double lines

Porto Torres to Castel Sardo) which traverses the cultivated fields at a distance of 1 to 2 miles from the coast.

From Point Pedras de Fogu a high rocky coast trends north-eastwards to Castel Sardo. A narrow metalled road keeps close to the shore, but landing-places are lacking except at a small bay-head beach just south-west of Castel Sardo. Castel Sardo, a fishing village of 2,692 inhabitants, stands on the seaward slopes of a promontory 430 feet high. Old walls almost surround the settlement, which is dominated by an ancient castle. The communications of the village include telegraph, telephone, and road 134, which connects with the Sassari-Tempio Pausania highway (127).

The coast continues rocky and steep for $2\frac{1}{2}$ miles north-east of Castel Sardo and then declines to a sandy beach almost $6\frac{1}{2}$ miles long. Throughout its length this beach is backed by a strip of sand-dunes, in places 600 yards wide. The western part of the beach is crossed by the lower Coghinas, which flows parallel to the shore and at about 300 yards from it, before entering the sea by a channel only a dozen yards wide. The extensive dune-belt near this estuary is skirted by a road which runs to Codaruina before turning inland to a thermal spa in the hills. The beach stretching for 3 miles north of the Coghinas estuary is isolated from good roads since the mountains to the east, beyond the small coastal plain, rise steeply to between 2,000 and 3,000 feet.

Cape Monte di Fava to Cape Ferro. Between Cape Monte di Fava and Cape Testa, a distance of 17 miles, the coast is cliffed and much indented, but none of the coves is large and relatively few have long beaches. The main beaches are in the north-east at Porto di Vignola, Cape Monte Rosso, and Cape Testa. The first two are served only by mule-tracks and are separated from the Tempio Pausania-S. Teresa road by a wide, rocky ridge of the scrub-clad Gallura mountains. The beach at Cape Testa is a low isthmus, 180 yards long by 100 yards wide, joining the rugged headland to the mainland and forming the heads of the bays of S. Reparata and La Corba. From the dune-strip east of the beaches a narrow road crosses rocky country (300 ft. high) to S. Teresa di Gallura (Fig. 46).

Between Cape Testa and Cape Ferro the Gallura hill-mass runs obliquely to the shore and forms a rocky coast, deeply indented, with large inlets and bold headlands. About 2 miles east of Cape Testa is S. Teresa di Gallura, a village of 1,566 inhabitants, situated about 200 yards from the western inland shore of Porto Longonsardo. A small wooden mole projects from this shore at a short distance

from the main road (133) connecting S. Teresa with Tempio Pausania (34 miles) and Palau (15 miles).

Eastward the next inlet of any size is Porto Pozzo, a long, narrow, steep-sided bay almost surrounded by hills. This bay is separated from Porto Liscia, a much larger inlet to the east, by a hilly peninsula, 308 feet high, which sinks almost to sea-level near the mainland, where it is severed by a narrow canal. Porto Liscia has at its head a beach $1\frac{1}{4}$ miles long fringing the delta of the Liscia. Because of this delta access inland is restricted to mule-tracks that wind along the river bank through scrub and cultivated fields for $1\frac{3}{4}$ miles to the Tempio Pausania-Palau highway. The low sandy base of the Cavalli peninsula divides Porto Liscia from Porto Pollo (Puddu), which also has at its head a long beach, served by mule-tracks. The wide, hilly headland between Porto Pollo and the Rada di Mezzo Schifo has a creek, the Cala di Trana, on its northern side, where a jetty, 140 feet long, has been constructed. No such facility exists, however, at the beach at the head of the Rada di Mezzo Schifo, although it is only 750 yards from the highway to Palau. The undeveloped nature of these beaches arises not merely from their isolation but also because of the predominance of Palau, an outlying part of the naval base of La Maddalena. At Palau a jetty, 155 feet long with depths of 13 feet alongside its head and its east side, projects from the western side of a cove. In another small creek, $\frac{3}{4}$ -mile farther east at Lo Stentino, there is a jetty, with a width of 35 feet and a length of 80 feet on its north side and of 150 feet on its south side; at its head is a depth of about 10 feet. From Palau a narrow-gauge railway and a road (133) run inland to Tempio Pausania and Sassari.

Between Palau and Cape Ferro a hilly, difficult country drops rather steeply to a rocky coast. The beaches are served only by mule-tracks except at a few places on the gulfs of Saline and Arsachena, where low depressions cross the adjacent hill-mass. On the north side of the gulf of Saline there is a jetty 120 feet long whence a narrow road winds up a cultivated valley to Palau. The head of the gulf of Arsachena has been silted up by the swampy delta of the R. di S. Giovanni, but landing-places giving access inland occur on the west side of the bay, where there are two jetties. The northern jetty (300 yards north-west of Isolotta Pa) is about 110 feet long and the southern (about $\frac{1}{4}$ -mile from the head of the gulf) 180 feet long. Both probably have 6 feet of water alongside. The southern jetty lies close to a road which runs inland 3 miles to the main Palau-Terranova route. The eastern side of the gulf of Arsachena and the

coast as far as Cape Ferro is for the most part rocky and difficult of approach. Because of the hilly nature of the country inland the various small creeks, two of which have jetties, are isolated, and are served only by local paths or mule-tracks.

Maddalena Archipelago. This archipelago consists of several granite islands and rocks situated off the north-east coast of Sardinia between Cape Testa and Cape Ferro. The seven main islands are Maddalena, Caprera, S. Stefano, Spargi, Budelli, Razzoli, and Sta. Maria. The first three of these form part of an Italian naval base known as La Maddalena,* which comprises the south shore of Maddalena, the south-west side of Caprera, the island of S. Stefano, and the section of the mainland near Palau and Lo Stentino. The following account deals only with that part of the archipelago lying outside the naval base. Much of the coast of Maddalena island is rocky, but a few small coves with landing facilities exist. Among these, on the west coast, are two landing-places at Cala Francese, about half a mile southward of Point Testiccioli; the one consists of a concrete pier projecting from the north-western side of the bay, and the other of a stone quay, about 340 feet long, near a stone quarry on the south-eastern corner of the bay. The latter structure probably has between 11 feet and 19 feet alongside; from both structures a track leads to the road at Cala Nido d'Aquila, a cove about 1 mile south of the Cala Francese. At the Cala Nido d'Aquila a jetty projects from near the northern entrance-point. This jetty, a stone-built construction about 260 feet long, has at least 9 feet of water on its eastern side and 15 feet at its head. In addition, between Cala Nido d'Aquila and Point Nera, the westernmost limit of the port of La Maddalena, there are two jetties and a short quay which have access to a road leading to the naval base.

Rocks and shoals fringe most of the north-east coast of Maddalena island, but landing can be made on the south side of Cala Spalmatore where a stone jetty, about 260 feet long and 20 feet wide, has a depth of 11½ feet at its head. This cove is connected by road to the town of La Maddalena (Fig. 53).

Caprera and Maddalena islands are separated by a narrow channel across which a causeway about 600 yards long has been built. Through this a passage, spanned by a swing bridge, can be used by small craft. The island of Caprera has few landing-places and few roads apart from those incorporated in the naval base. On the west coast near the head of Porto Garibaldi there is a stone jetty about 200 feet long and 15 feet wide, but with shallow water alongside. On the

steep, rocky east coast the few bay-head beaches are small and isolated, except for that at Cala Portese in the extreme south which is divided from the naval base by a narrow isthmus only.

Spargi island is hilly, rugged, and fringed with rocks, especially on its western side. Landing-places, connected by road or track with the interior, occur on the north coast south-east of Point Zanolto, on the east coast at Cala Canniccia, and on the south coast near Cala Corsara, but only the last two have jetties. The small islands of Budelli and Razzoli are hilly and rugged and for landing offer nothing better than small beaches. Sta. Maria, although flatter and more cultivated, has no notable landing facilities.

East Coast (Fig. 46)

Apart from its northern extremity, the east coast of Sardinia is relatively straight and consists of an alternation of rocky, precipitous headlands and long alluvial beaches. The country inland is for the most part steep, mountainous, and unfavourable to transport. Yet a main road (125) traverses almost the whole length of the area and, although rarely approaching the shore, is seldom more than 4 or 5 miles from it. The main land connexions start from Golfo Aranci, Terranova,* Sa Caletta (near Siniscola), Orosei, Arbatax, and Muravera. The bulk of the trade centres on Terranova and Golfo Aranci.

Cape Ferro to Cape Coda Cavallo. In this section the hill-ridges of Gallura enter the sea, forming bold, rocky headlands separated by irregular steep-sided inlets. The numerous bays and small coves on the east side of the Cape Ferro promontory are served only by mule-tracks which wind amid high, rocky hills, dotted with patches of grass and scrub, and, in the valleys, with cultivated fields. At the head of the bay on the south-eastern side of this promontory is a long, narrow inlet, Porto Cugnana, with a strip of sandy beach and a small jetty from the vicinity of which a road leads inland 3 miles to the Golfo Aranci-Terranova highway. Between Porto Cugnana and the gulf of Terranova long stretches of cliffed headlands alternate with short beaches, including one at the head of the gulf of Marinella, where a telegraph cable comes ashore, and another not far to the east which is backed by an embankment carrying the Golfo Aranci-Terranova railway. Several small islands and rocks rise from the shallow water off this coast, the largest, Mortorio, being 250 feet high.

Between Cape Figari and Cape Ceraso the shore recedes to form the gulf of Terranova. A subsidiary bay on the northern side of the

main gulf, sheltered by Cape Figari headland, contains Golfo Aranci, a fishing village of about 400 inhabitants. A mole, about 600 feet long and from 75 to 120 feet wide, extends from the shore near the village. This structure, alongside which the depths range from 20 feet up to 26 feet, has mooring bollards and three landing-places. In addition to the mole there are two jetties for small craft. A single-track, standard-gauge railway and a main road run from the mole to Terranova. The annual trade of the port averages about 29,000 tons, the bulk of which consists of imports.

There are several beaches on the coast of the gulf of Terranova south-west of Golfo Aranci, but some are backed by lagoons and all are isolated from main routes by the steep slopes of M. sa Curi (1,361 ft.). The inlet at the head of the gulf forms the harbour of Terranova (Olbia).^{*} Much of the southern shores of the gulf consist of the marshy delta of the F. Padrogiano and of sandspits backed by salt-water lagoons. The coast between Cape Ceraso and Cape Coda Cavallo is for the most part fringed with off-lying rocks and islands. The two largest islands are Tavolara, a narrow, precipitous ridge rising to 1,850 feet, and Molara, an oval hill-mass, 531 feet high, covered with bushes and cultivated fields.

Cape Coda Cavallo to Cape Monte Santo. Between Cape Coda Cavallo and Cape Comino, 23 miles to southward, the land near the coast is predominantly agricultural and is dotted with farm buildings. The littoral strip is low and sandy and where crossed by rivers expands into a wide alluvial plain, not infrequently spattered with marshes. Consequently, routes inland avoid the valleys and the only good connexion with the interior is by means of a winding hilly road from Sa Caletta to Siniscola. Many of the sandy beaches, as at Porto Brandinchi, La Cinta, and Cala di S. Anna, are cut off from the main coastal highway by salt-water lagoons and swamps. The main beach stretches for about 2 miles on either side of the headland near Sa Caletta, but only the central part has easy access inland, since the north forms the marshy mouth of the F. di Posada and the south the salt-lagoons and swamps of the estuary of the R. de Siniscola. From the hamlet of Sa Caletta narrow metalled roads lead to the coastal road (125) and to the town of Siniscola.

From Cape Comino the coast trends south-south-westwards for 11 miles to Point Nera, and for most of this distance is backed by hills which attain between 600 and 900 feet within 2 miles of the seaboard. Between Point Nera and Cape Monte Santo, 21 miles to the south, lies the crescent-shaped gulf of Orosei. The northern part

of the gulf is backed by the wide alluvial lowlands of the F. Cedrino. On the south bank of this river, about $1\frac{1}{2}$ miles from its mouth, stands the town of Orosei, whence a main highway (129) leads westward right across Sardinia, and a good secondary road runs eastward to the coast at Orosei Marina. From Orosei Marina a beach extends south-westwards for about 4 miles to Caletta d'Osalla. The shore of the curving bay south of this beach is for the most part steep and rocky, and rises sharply inland to heights of 1,500 to 2,000 feet within $1\frac{1}{2}$ miles of the sea. The rivers, such as the Codula di Luna and Codula di Sisina, have built up small plains at their mouths; in summer, narrow roads lead up and alongside their beds, which in winter become raging torrents. The main road (125) keeps between $4\frac{1}{2}$ and 8 miles from the coast, and is only reached easily from Porto Gonone, the landing-place for the town of Dorgali. Coasters call regularly at Porto Gonone where a jetty, 55 feet long, gives access to a road that winds over the hills to Dorgali.

Cape Monte Santo to Torre Murtas. A high, steep coast, rising sharply to over 2,000 feet within a mile of the sea, stretches for $5\frac{1}{2}$ miles from Cape Monte Santo to Point Sta. Maria. Beyond the latter headland is a sandy beach, 3 miles long, at the head of the gulf of Tortoli. Much of the northern half of this beach is backed by marshes, while all of the southern half is cut off from the interior by a large lagoon at the mouth of the R. Mirenu. At the southern end of the beach, on the north side of the rocky Cape Bellavista (475 ft.), is Porto di Arbatax, the commercial outlet of the town of Tortoli. The harbour is formed by two breakwaters, a western 480 yards long and an eastern 500 yards long. The latter curves westwards and narrows the entrance to the port to about 350 yards. The depths in the entrance range from 24 to 36 feet except near the eastern breakwater, where they decrease to less than 16 feet. In most of the north-eastern part of the harbour there are depths of over 25 feet, but the water shoals to 3 feet or less near the head of the harbour where silting is common. The southernmost section of the eastern breakwater, about 320 feet long, is quayed on its inner side and from its root another quay of about the same length extends south-westwards. Alongside the former are depths of 9 to 14 feet, and alongside the latter of 15 feet. The outer half of the western breakwater is quayed, but is so shoal that only small craft can use it. All the quays are served by the railway to Tortoli and Cagliari. In addition, a good metalled road leads westward to Tortoli (3 miles), where it crosses the main coastal highway (125) and proceeds inland.

Between Cape Bellavista and Point su Mastixi, 5 miles to the south, the coast is fringed with rocks except off the beaches at Porto Frailis, at the mouth of the F. Foddeddu, and at the head of Scoglirossi bay. About 1 mile south of Point su Mastixi the rocky shore gives way to a sandy beach $4\frac{1}{2}$ miles long. The only good route leading inland from this beach is in the extreme north, where a metalled road runs from Torre di Bari Sardo to the village of Bari Sardo (road 125). South of this beach a steep, rocky coast bordering M. de Ferru stretches $3\frac{1}{2}$ miles to Cape Sferracavallo; similarly, between Cape Sferracavallo and Torre Murtas, 12 miles to the south, a block of hilly country, about 3 miles wide and from 1,500 to 2,000 feet or more high, effectively isolates the seaboard from the main coastal route.

Torre Murtas to Cape Carbonara. The coast between Torre Murtas and Cape Carbonara, 33 miles southward, consists of three long sandy bays and three rocky promontories. The northernmost of the bays, the Cala de s'Acqua Durci, has a beach about $3\frac{1}{2}$ miles long at the mouths of the F. Durci and R. Bracconi. Behind the beach is a strip of scrub-covered dunes, which, north of the F. Durci, grades inland into low-lying ground, with low rocky knolls, and patches of marsh and scrub. In the centre the hinterland is cultivated but damp; in the south it is under marsh and lagoon. Only rough tracks lead inland except in the extreme south where an unmetalled road leads to the coastal road near S. Barbara in the Quirra valley. Sailing-craft sometimes load charcoal at this part of the beach.

A 3-mile stretch of steep, rocky coast and rugged hills separates the Cala de s'Acqua Durci from the much larger bay at the mouths of the F. Flumendosa and T. sa Picocca. Here a sandy shore, 8 miles long, is for the most part backed by marshes, water-channels, and salt-water lagoons. Most of the inhabitants live in the Flumendosa valley 3 to 4 miles from the sea, where the small towns of Muravera, Villaputzu, and S. Vito lie amid cornfields, vineyards, and olive groves. The port for these settlements is at Corallo, a mile north of the mouth of the F. Flumendosa, whence a good metalled road winds inland. Elsewhere the beach is practically cut off from the interior by water-channels, lagoons, and marshes. The southern stretch of beach is especially isolated since in this area the main coastal road (125) turns westwards up the Picocca valley and crosses the Sarrabus highlands to Cagliari. The steep, rugged headland of Cape Ferrato is also remote from main routes.

The coast between Cape Ferrato and Point Cappuccini, 9 miles

southward, consists mainly of a sandy beach backed by hilly country with summit heights of between 400 feet and 900 feet. These hills are separated from the main mountain-mass of Sarrabus to the west by a low, flat-bottomed valley draining northward to the Picocca. The only metalled road serving this stretch of coast runs from Porto Sinzias inland to Castiadas and thence along the valley mentioned above to the main Muravera-Cagliari road (125).

The 4 miles of coast between Point Cappuccini and Point Molentis is steep and rocky and is dominated by rugged, scrub-covered hills, among the most barren and desolate in Sardinia. South-west of Point Molentis there is a bay (Porto Giunco) with a beach at its head that gives access to the small cultivated plain near Villasimius. From this village a narrow metalled road runs westward along the coast to Cagliari.

South Coast

The south coast of Sardinia falls naturally into two sections, the gulf of Cagliari and the southern shores of the Iglesiente hill-mass. Movement inland is easy only from Cagliari,* which is backed by the plain of the Campidano; elsewhere the coastal areas rely for overland connexions mainly on roads leading along the coast to the capital.

Gulf of Cagliari. The gulf of Cagliari lies between Cape Carbonara and Cape Pula, about 25 miles to the west-south-west; from a line connecting these two capes the bay extends northwards for 12 miles to the town of Cagliari.

The north-east coast of the gulf is backed by the Sarrabus mountains which extend to the seaboard as high, steep promontories. The streams draining these highlands have at their mouths small lowlands and sandy beaches. Thus in the east between Cape Carbonara and Cape Boi there are seven short stretches of sandy beach which give possible access to the Villasimius-Cagliari road. Between Cape Boi and Torre Mortorio, 8 miles to the north-west, the coastal route passes close to six small beaches, whence ingress is not difficult except in time of heavy rain.

Between Torre Mortorio and Cape S. Elia the coast backs on to low sandstone hills. As far west as the marshy mouth of the R. de sa Pispisa low bluffs, usually less than 15 feet high, grade imperceptibly inland into scrub-covered slopes and so to cultivated fields. Between the low, rock-fronted cliffs of Torre S. Andrea and Torre Foxi there stretches a beach 1,200 yards long. Westwards of Torre Foxi is the sweeping curve of the gulf of Quartu, which is formed

of a sandy beach 5 miles long. This beach, and a narrow strip of open, sandy ground behind it, is backed by the Stagno di Quartu, much of which has either been drained or, as happens in the south, has been converted into salt-pans which can be flooded to a depth of a few feet. In the south the beach has been incorporated into the built-up area of Cagliari; here are the race-course, and the bathing-beach (Spiaggia del Poetto) whence tramlines and a metalled road run to the centre of the capital. Farther south is the rugged headland of M. S. Elia (446 ft.), on the eastern side of which white limestone cliffs face the gulf.

The western side of the gulf of Cagliari extends from Cape S. Elia to Cape Pula. The first 4 miles of this coast—as far west as the Scaffa canal—forms the waterfront of Cagliari.* From the Scaffa canal to La Maddalena, a distance of 5 miles, a narrow strip of sand and scrub-dotted ground is backed by the salt-pans and marshes of the Stagno di Cagliari. This littoral strip is intersected by seven narrow channels, each bridged by the Cagliari–Pula road which runs along the natural causeway. La Maddalena is the terminus of a narrow-gauge railway built to serve mines in the Iglesias.

Between La Maddalena and Torre Loi, $1\frac{1}{2}$ miles southward, the low-lying coast continues and, for the most part, is backed by gently sloping farmland. The Cagliari–Pula road nowhere diverges more than 800 yards from the beach. Towards Porto Foxi, 4 miles south of Torre Loi, the slopes inland become steeper and tree-growth gradually replaces cultivations. Villa d'Orri has a small pier and a drainage channel to the sea. Beyond Porto Foxi the coast sweeps round M. Arrubiu (866 ft.), a steep, barren hill which drops to the sea in cliffs as high as 160 feet near Torre del Diavolo. Between this cliffed headland and Cape Pula the coast is lower and contains four small beaches. One of these lies at the mouth of the R. di Pula, about 1 mile from the village of Pula; another, just north of Cape Pula, has a pier 80 feet long. From all these beaches unmetalled roads lead westwards, mainly over farmlands, to the Pula–Cagliari highway.

Cape Pula to Cape Teulada. From Cape Pula to Cape Spartivento, 10 miles to the south-west, rocky headlands alternate with sandy beaches and the hinterland, although generally low, tends to increase in height southwards. About 2 miles north of the mouth of the R. di Chia, where a hill-range ends in cliffs nearly 160 feet high, the main Cagliari–Teulada road turns inland to Domus de Maria. A branch road continues for a few miles down the R. di Chia valley, but it

does not reach the coast and, consequently, does little to relieve the isolation of the low-lying, scrub-dotted littoral near Cape Spartivento.

At Cape Spartivento the coast turns north-westwards to Porto Teulada, about 7 miles distant. It is for the most part cliffed, fronted by rocks and backed by hilly, dissected country. The few stretches of beach communicate inland by means of mule-track except at Porto Teulada, where a good metalled road runs close behind the beach east of the R. Leonasciu and gives connexion with the main coastal highway. Much of the lower valley of the R. Leonasciu is marshy, especially in late winter.

Between Porto Teulada and Cape Teulada, 6 miles to the south-west, rocky stretches alternate with short beaches. The coast is backed by rather desolate hills 800 to 900 feet high, and crossed by poor, unmetalled roads. The rocky headland of Cape Teulada (732 ft.) is joined to the mainland by a low, narrow isthmus.

West Coast

The west coast of Sardinia stretches from Cape Teulada northwards to Cape Falcone. It falls naturally into four sections: a south-western, island-fringed section from Cape Teulada to Cape Altano (north of Portoscuso); a rocky southern section, forming the shore of the Iglesias mountains between Cape Altano and Cape Frasca; a low-lying central section, the fringe of the Campidano, between Cape Frasca and Torre su Puttu; and a northern hilly section prolonged in the island of Asinara. The chief ports are S. Antioco in the extreme south and Alghero in the extreme north; the smaller ports of Bosa, Botte, and Portoscuso also have good communications with the interior.

Cape Teulada to Cape Altano. The coast between Cape Teulada and the narrow isthmus connecting S. Antioco island to Sardinia proper consists of an alternation of cliffed headlands and sandy beaches. In the south the bay-head beach of Cala Piombo, lying between the promontories of Cape Teulada (738 ft.) and Point Cala Piombo (878 ft.), is served only by mule-tracks. The curving shore north of Point Cala Piombo is cliffed for 3 miles and then drops at Porto Pino to a sandy beach, $2\frac{1}{4}$ miles long. The central parts of this beach are backed by extensive salt-pans, but from its northern end an unmetalled road connects with the Teulada-Giba road. Porto Botte, the next bay to the north, also has a sandy, low-lying shore backed by lagoons and salt-pans. This bay, however, has two wooden

piers used for shipping lignite; from these piers a good main road (126) and a railway give communication with the rest of Sardinia. The narrow-gauge railway ending at the piers serves the lignite mines at Pantaleo.

The coast of the mainland north-west of the S. Antioco isthmus is shoal for a considerable distance off shore at least as far north as Porto Vesme. Here the Monteponi Mining Company has dredged a channel 760 yards long and 55 yards wide which allows vessels of up to 13 feet draught to use the port. The main quayage is in the south of the port, where a stone quay, with about 13 feet alongside, extends from a pier southwards to some steps at the base of a breakwater. The pier itself is about 65 feet wide and extends about that distance from the quay; it has about 14 feet alongside its head. From the root of the pier another quay extends 1,180 feet northwards, the last 750 feet forming the west side of a narrow basin; the depths alongside this quay decrease from 7 feet near the pier to 5 feet at the inner end of the basin. The eastern side of the basin is also quayed and forms at its outer end a mole with about 6 feet along its head. The trade of Porto Vesme depends mainly on the export of lead and zinc from the Iglesias mines and of lignite from Bacu Abis. In 1938, when 980 ships totalling 106,198 tons used the port, about 27,338 tons of goods were discharged and 32,966 tons loaded. A narrow-gauge mineral railway runs from the quays to Bacu Abis, where it joins the narrow-gauge line from Iglesias to Palmas Suergiu. Metalled roads lead to Portoscuso and Paringianu.

Only a short stretch of beach and a low rocky headland separate Porto Vesme from Portoscuso. The latter, a village of 1,556 people, stands on a low, flat promontory (40–50 ft.) from which a metalled road leads inland. A quay with about 5 feet alongside has been built on the south-east side of the village. Most of the coastline between Portoscuso and Cape Altano consists of cliffs from 50 up to 350 feet high.

The larger of the two main islands off the south-west of Sardinia is S. Antioco, which is joined to the mainland by a narrow, sandy isthmus. South of this isthmus lies the gulf of Palmas, in which a large fleet can obtain anchorage. On the south-western end of the isthmus is Porto Ponte Romano, the commercial outlet of the town of S. Antioco. The port is entered from the south-east by a marked channel, about 195 feet wide, 2,500 yards long, and dredged to a depth of 26 feet. The harbour extends from the isthmus south-eastwards for about 1,000 yards to a detached breakwater which

protects it on the south side. From the isthmus a promontory of reclaimed land, about 1,375 feet long by 740 feet wide, has been built out into the harbour; the waterfront of this construction is quayed and, in 1940, had depths of 26 feet alongside, except on the west where dredging had proceeded to 13 feet only. Most of the area between the outer end of the promontory and the breakwater had also been dredged to 26 feet. The promontory is served by rail, and from its northern end a road and railway run along a narrow causeway to the mainland. The chief exports of Porto Ponte Romano are coal, charcoal, lead, zinc, wine, cheese, and grain; the main imports are flour, wood, bricks, and steel.

The coast of S. Antioco island south of Porto Ponte Romano is served only by a poor, unmetalled road. The first 2 miles consist of a sandy beach backed by a belt of low-lying ground, 400 to 1,400 yards wide. Farther south the hills extend to the coast, which is cliffed except at the heads of three small bays. The west coast of the island, from Cape Sperone almost to Point Maggiore, has almost continuous cliffs, fronted in parts with boulders and small rocks. The north-west coast, from Point Maggiore to Calasetta is steep and rocky, but fairly low, and has four beaches whence poor roads lead inland over gently undulating farmlands. The northernmost beach is at Calasetta, a town of 2,419 inhabitants. The port, which has a masonry mole about 50 feet wide and 200 feet long, does little trade; in 1938 it was used by 1,009 ships totalling 62,760 tons, and these discharged 816 tons of cargo and loaded 2,197 tons, mostly wine. A narrow-gauge railway and a metalled road lead to the town of S. Antioco (Plate 48).

Between Calasetta and Porto Ponte Romano the coast of S. Antioco island is low, marshy, and fronted by a wide expanse of shoal water. A narrow channel, dredged to 13 feet, leads through the flats, passing close west of Point Tretti on the mainland before turning southward to S. Antioco and Porto Ponte Romano. In front of S. Antioco town (6,750 inhabitants) there are rough stone quays with about 9 feet alongside.

The island of S. Pietro is at its nearest point about $2\frac{1}{2}$ miles north-west of S. Antioco island and 4 miles south-west of the Sardinian mainland. The intervening channels could afford anchorage to many large ships, but the island itself has few ports or landing-beaches. Its north, west, and south coasts are formed almost entirely of cliffs, and the few small beaches are remote from roads. The east coast, between Point Gerino and La Punta, is mostly low-lying and sandy, but much of it is fronted by shoals. The main landing-place is at Carloforte,

a small port which acts as a transshipment point for ores, carried hither in small craft, from some of the mines in south-western Sardinia. Carloforte (8,030 inhabitants) is also a tunny-fishing centre and produces salt from extensive local salt-pans. The harbour is about $\frac{1}{2}$ mile long by $\frac{1}{4}$ mile wide and will take ships of up to 13 feet draught. It is contained between two breakwaters, each about 650 feet long and quayed on the inner side. Nearly all the head of the harbour is quayed, the chief quays being in the northern half, from which the main jetty projects eastward. This pier is about 400 feet long and 80 feet wide, and has depths of 10 feet alongside, with probably a slightly greater depth near its head. It is used by mail steamers and vessels loading ore. The quays on the inner side of the north and south breakwaters have about 13 feet alongside, whereas those at the head of the harbour are accessible to fishing-boats and small craft only. A slipway for craft of up to 100 tons and two small workshops capable of undertaking minor repairs occupy the south-eastern corner of the harbour. In 1938, when 3,815 ships totalling 261,000 tons used the port, 32,443 tons of goods (mainly ores) were unloaded and 51,160 tons loaded. A narrow road leads northward to the tunny-curing factory at La Punta; here, and at Point Grossa, $1\frac{1}{2}$ miles to the south, there are several wharves for small craft.

Cape Altano to Cape Frasca. For most of this distance (33 miles) the coast is rocky and steep and contains few beaches. Between Cape Altano and Point Rama, 9 miles to the north, the coast recedes to form a large bay with shores cliffed except at its head, where there is a sandy beach $1\frac{1}{2}$ miles long. The land behind the beach is marshy since the R. sa Masa enters the sea here. The village of Fontana a Mare, built on the plain north of the river, is joined by a poor metalled road to the Palmas Suergiu-Iglesias road (126). On the high, cliffed coast just north of this beach there is a small wharf for loading minerals at Nebida, another wharf, 130 feet long, at Masua, and an electric loader, which protrudes from an opening in a perpendicular cliff, at Porto Flaira. All these places are on or near a metalled road winding southwards to Fontana a Mare.

Just north of Cape Rama minerals are exported from the Cala Domestica and from Buggeru, a mining village situated in a sandy gorge opening out on to a small bay, where a wharf, about 230 feet long and with about 8 feet alongside, has been built. In 1938 this wharf was used by 45 ships, totalling 1,370 tons, and handled 881 tons of imports and 1,240 tons of exports. A narrow-gauge railway connects the village with the mines at Malfidano, $1\frac{1}{4}$ miles inland.

About 2,000 yards north of Buggeru the cliffs are replaced by a sandy beach which stretches for 1 mile to Portixeddu. From this village a poor road leads southwards to Buggeru and a good metalled road ascends the Mannu valley to the Iglesias-Guspini road (126).

The coast between Portixeddu and Cape Pecora and thence for 14 miles to Torre di Flumentorgiu is for the most part either cliffed or fronted by rocks. The only long clear beach is between the mouths of the R. Naracauli and R. Piscinas, about 6 miles north of Cape Pecora. Near the mouth of the former stream a natural platform at the water's edge is used for loading mineral ore brought by narrow-gauge railway from the mines near Ingurtosu and Gennamare. North of the mouth of the R. Piscinas a belt of rugged, hilly country, 6 to 8 miles wide, separates the coast from the flat plain of the Campidano. North of Torre di Flumentorgiu this hill-barrier merges into the peninsula of Santadi, a thickly wooded, steep-sided plateau, at 180 to 250 feet above sea-level, terminating in Cape Frasca.

Cape Frasca to Torre su Puttu. The north-western end of the Campidano is bordered by the gulf of Oristano and the shores of the Sinis peninsula. The gulf of Oristano is entered between Cape Frasca and Cape S. Marco, $5\frac{1}{2}$ miles northward. The curving shore of this large bay is mostly low and sandy, and is backed by a belt of sand-dunes. Behind these dunes are long stretches of lagoons and marshes, some of which have been recently reclaimed and are now under intensive cultivation, especially of cereals and vegetables. The R. Sitzzerri enters a large lagoon at the south-eastern corner of the bay. North of this lagoon stretch the reclaimed lands of the new settlement of Mussolinia, which lies behind a sandy coastal strip, about 600 yards wide, planted with a windbreak of bushes and low trees. The reclamation has greatly diminished the area of the Stagno di Sasso and has practically obliterated the Stagno di S. Giusta. The reclaimed area is criss-crossed with a rectangular pattern of ditches and roads, some of which are lined with trees. The lower course of the F. Tirso, which enters the north-eastern shore of the gulf of Oristano, has been embanked in order to protect the town of Oristano and the flat farmland near it from flooding and to assist in further schemes of reclamation. The traffic of the gulf is handled at Torre Grande (Gran Torre), about $1\frac{3}{4}$ miles north-west of the mouth of the Tirso, where a jetty 230 feet long has been built. From the jetty a metalled road leads along an embankment to the junction of the main highways from Oristano to Macomer (road 126) and to Cuglieri. West of Torre Grande most of the shore is backed by extensive salt-

marshes and lagoons, the only eminence being the rocky promontory of Cape S. Marco (184 ft.).

Between Cape S. Marco and Torre del Sevo the coast is sandy but is mostly fronted by rocks, and, even where clear, is backed by marshy ground. From Torre del Sevo a low-lying beach, with an interruption of low bluffs near its centre, stretches to Cape Mannu. Numerous unmetalled roads connect this coast to the low Sinis region and to Torre Grande. Cape Mannu is a rocky peninsula, 157 feet high, joined to the mainland by a low isthmus which is almost severed by a salt lake. Eastwards to Torre su Puttu the coast forms a large bay which has a wide belt of sands and sand-dunes at its head. The main Oristano-Cuglieri road skirts these dunes and passes within 200 yards of the sea near Torre su Puttu.

Torre su Puttu to Cape Falcone. Northward of Torre su Puttu low cliffs extend to within half a mile of the mouth of the F. Temo. Here a beach on the south side of the estuary gives access to the hamlet of Bosa Marina. The dilapidated breakwater extending about 100 yards from this beach has been superseded by a quay on the south bank of the river, 250 yards from its mouth; this structure is about 300 feet long and has depths of from 12 to 15 feet alongside. The Temo is navigable for ships up to 6 feet in draught for 350 yards and for small craft to the town of Bosa, about $1\frac{1}{4}$ miles farther upstream, but the river bed is liable to change considerably and the current becomes very strong in time of spate. On the south bank opposite Bosa town there is a quay for small craft. From a terminus near this quay a narrow-gauge railway descends the valley to Bosa Marina, whence it follows a circuitous course to Macomer ($29\frac{1}{2}$ miles). A main road (129) runs from Bosa Marina to the south bank of the Temo near the railway terminus, whence a branch road crosses the river to Bosa town, and the main road proceeds right across Sardinia to the east coast near Orosei.

From Bosa Marina north to Porto Poglina, a distance of 14 miles, the coast is cliffed and steep and, although a few small bay-head beaches occur, they are practically unapproachable from seaward and landward. The cliffs rise inland to an undulating plateau of volcanic rocks where steep-sided, tabular hills and shallow valleys abound, but roads are few and the patches of cultivation are dwarfed by the expanses of low scrub. North of Porto Poglina the coast becomes lower and more cultivated, but access is restricted by rocks and shoals. Towards Alghero, and for about 3 miles north and south of the town, the coastal strip is closely settled, with numerous farmsteads dispersed among small arable fields and vineyards.

The town of Alghero (14,579 inhabitants) stands on a rocky promontory at the southern corner of a large bay, the Rada di Alghero. The old quarter, a jumble of narrow streets and solidly-built houses, is confined to the small promontory and is almost surrounded by a wall; the new quarter extends over flatter, cultivated ground to the east. The town has a civil hospital and anti-tubercular dispensaries and is provided with electric light and a good supply of drinking-water. The inhabitants live mainly by fishing (especially for crustaceans), agriculture, and stock-breeding, the only notable manufactures being food preserves and fishing-boats.

The port of Alghero consists mainly of a western mole and of three quays bordering a shallow, northward-facing basin. The mole, a structure about 650 feet long and $16\frac{1}{2}$ feet wide, projects from the end of the promontory. It has 9 feet of water alongside its northern side; its southern side, which is not available to shipping, rises to a high, wide parapet. From the base of this mole a shoal patch extends eastwards almost to the foot of a small breakwater. East of this breakwater lies a quayed basin; here the western side, or quay, which extends for 400 feet and has 10 feet alongside its outer end and $1\frac{1}{2}$ feet at its inner, can be used by ships of up to 100 tons; the southern and eastern quays are of about the same length but can be used by very small craft only. The port is of very little importance commercially, the only noteworthy exports being olive oil and wine. Yet it has excellent communications with the rest of Sardinia; a railway, commencing close to the east quay, runs to Sassari, while good metalled roads lead respectively north-west to Torre Nuova on Porto Conte, north-east to Sassari (127-bis), and south-east to Villanova Monteleone.

A curving beach, backed in the south by flat, cultivated land and in the north by sands and a large lagoon, stretches $2\frac{1}{2}$ miles northward from the port of Alghero. The coast then becomes rocky, steep, and indented. Porto Conte, an inlet 3 miles long by $1\frac{1}{4}$ miles wide between Point Giglio and Cape Caccia, forms a safe anchorage although its shores are either steep or rocky, except for small sandy beaches at its head. At Torre Nuova, which stands on a narrow promontory projecting from the east side of the bay, a jetty 100 feet long is available for small boats and launches. From this promontory a main road (127-bis) leads eastward $8\frac{1}{2}$ miles to Alghero.

Between Cape Caccia and Point Gallo the coast continues high and steep, with hills rising sharply inland to 900 feet. Thence to Torre Bantine Sale, about 3 miles northward, the undulating country of the Nurra ends in a low, indented, rock-fringed seaboard. Just north of

Torre Bantine Sale there is a sandy beach at the head of Porto Ferru, which, however, is 4 miles from the nearest metalled road. A high, inaccessible coast stretches from Porto Ferru to Cape Argentiera, but immediately north of the latter cape small vessels can use a cove near the small mining village of S. Nicolo dell' Argentiera. A jetty serves the village and gives access to a narrow road to Porto Torres and Sassari. North of S. Nicolo, although the country inland seldom exceeds 700 feet, the coast is rocky, rugged, and high as far as Cape Falcone.

A strait about 2,400 yards wide separates Cape Falcone from Asinara island. This channel is interrupted by the islet of Piana, which has a height of 79 feet. The much larger island of Asinara consists of a northern hill-mass, about 3 miles across, which is joined by a long, narrow neck of land to a southern hill-mass, about 2 miles across. The island is hilly and, apart from patches of woodland and plots of cultivation, is barren. Its west coast is rugged, rocky, and practically inaccessible since the coves afford little protection. The east coasts of the two hill-masses are almost as inhospitable, while the neck, although low and in parts sandy, has long stretches of rocky shoreline. A narrow road runs the length of the island and serves a penal settlement situated on the north side of the Cala d'Olive, a cove on the north-east coast. The quarantine station for this settlement extends along the north side of the Rada delle Reale, where there are a pier, 250 feet long with depths of 13 feet alongside, two jetties, one of which (east of Point Irabuco) is 130 feet long, and several short beaches. In the southern part of Asinara island the main landing-place is south of Fornelli village, where a small jetty projects from the centre of a long beach.

VEGETATION

The flora of Sardinia is not rich in number of species compared with other Mediterranean areas of equivalent size. There are about 1,950 species of vascular plants recorded, of which a fair proportion are endemic (that is, found in no other part of the world) either to Sardinia or to the Tyrrhenian district. The largest floristic group is that of general Mediterranean species (I, p. 441) which range more or less throughout the Mediterranean region or at least through the Mediterranean basin. There are 835 of these, occurring especially in the lower parts of the island and including species of well-known Mediterranean genera, such as *Silene*, *Dianthus*, *Genista*, *Cytisus*, and *Cistus*. Of the 178 Sardinian-Tyrrhenian endemics 100 are related to general Mediterranean species. A group of 169 western Mediter-

anean species is mainly spread in the coastal districts and in the holm oak zone. About 40 species have apparently migrated from the steppe districts of north Africa, presumably along a land connexion with Africa in Pliocene times. Some 60 southern species came to Sardinia over such land links with Africa and Sicily. There are about 40 Mediterranean species of the montane zone and about 180 of the broad-leaved forest zone, but only 16 of the western European or so-called Atlantic element. The remaining species have wider ranges, at least Eurasiatic or Northern Hemisphere. In spite of the great modifying influence of man the Sardinian flora is essentially that of Mediterranean forest land and has closer relationships to the flora of Corsica than to that of Sicily.

Vegetationally too Sardinia is typical of the western Mediterranean, but from this standpoint it shows more resemblances with Sicily than with Corsica. This is partly due to the complex pattern of outcropping igneous, metamorphic, and sedimentary rocks. Altitude has an important connexion with the distribution of the plant communities. There is a rather sharp boundary at 2,600–2,900 feet between the lowland and hill vegetation on the one hand and the montane vegetation on the other. In the lowland and hill zone the woody plants are mainly evergreen hard-leaved shrubs and a few trees, in the montane zone the great majority of trees and shrubs are deciduous. The destruction of forest by man has been extensive and long continued, but is most marked in the lower parts, where there is now practically no tall woodland. Where the ground is neither cultivated nor swampy much brushwood (*macchia*, I, p. 455) has grown up.

In the following account of the plant communities and their distribution in the island an arrangement based on general physiography is followed.

Forests

As already indicated, forests were formerly much more extensive than they are at present (p. 589). Probably before the advent of man even the lowlands and hills had woods of Aleppo pine,¹ and evergreen oaks, and tall *macchia* merging into forest. At present forests are mainly limited to higher altitudes, and even there have been much restricted or damaged through cutting for firewood, charcoal, and timber, or to increase pasturage for goats. The principal trees are sweet or Spanish chestnut and oaks, while other species occur only as scattered individuals.

¹ For the botanical and Italian names of most species see I, pp. 463–466.

The area covered by chestnut as a forest tree is limited (2,850 acres) and scarcely extends beyond the western slopes of Gennargentu (Aritzo, Desulo, Tonara, and Ovodda), the neighbourhood of Santu Lussurgiu, and here and there in Gallura. It occurs as a solitary tree elsewhere here and there in the island, but its communities cannot be compared in size and value with those of Corsica.

Of the three important species of oak the most widespread is the holm oak. It used to form extensive forests in the south-western and south-eastern hills and mountains, but has been largely exterminated by charcoal burners. Fine examples are still to be seen in rocky valleys and other places difficult of access. Some small attempts to reafforest with the holm oak have been made locally as on M. Marganai near Iglesias. Compact and quite fine holm oak forests still occur (or did till recently) south and east of the Gennargentu massif. The commune of Villagrande has fine holm oak woods extending over the calcareous mountains of the east coast, though these woods are now somewhat broken up. The neighbouring communes of Baunei and Dorgali have attempted to repair past ravages by a rational forest policy. In other districts of the island the holm oak occurs sporadically and becomes always rarer towards the north. It is independent of the nature of the soil and grows equally on calcareous and non-calcareous rocks. Some macchia shrubs, especially tree heath, occur in the holm oak woods and mention must be made of the magnificent peony (*Paonia officinalis* var. *mascula* and var. *tritermata*) which is a constant companion of the holm oak throughout the higher parts of its range in Sardinia.

The north of the island is the special district of the cork oak. This extends from the north point of the island over the entire granitic area of the Gallura and the mountain group of M. Nieddu and M. Lerno to opposite Nuoro, where its boundary indents that of the holm oak woods, though scattered holm oaks occur in cork oak woods. The cork oak forms a fairly closed canopy with very little shrubby undergrowth, but having a number of sappy herbs and grasses forming a field layer. The quality of Sardinian cork is low and its export normally limited in quantity (III, p. 137).

The third important oak is the sessile oak (*Quercus petraea*), which is limited to the mountains and appears to avoid limestones. It can withstand winter cold better than the other oaks and is adapted to life in the higher mountains by its deciduous habit. It forms forests especially round the Gennargentu massif and farther south round M. Santa Vittoria in the extensive mica schist districts. Occasionally

there is a reversal in zonation and holm oak occurs above sessile oak where limestones outcrop at higher altitudes than schists. A second distributional area of sessile oak is the Catena del Marghine and especially the basalt plateau of Macomer and its northern slope to Bonorva. In Sardinia the sessile oak does not form closed forests but light groves or occurs scattered in brushwoods or 'heaths'. Many of the trees are hacked in order to provide foliage as fodder for animals in the summer.

In addition to the sweet chestnut and oaks reference should be made to Mediterranean and red junipers which occasionally develop as trees 16 to 24 feet tall, as between the Dolaverre valley gorge and the Gola di Gorropu. Trees of a maple (*Acer monspessulanum*) are sometimes mixed with the junipers. The yew occurs frequently as solitary trees in all the mountains. The Aleppo pine is limited now to a few coastal districts (e.g. S. Pietro) and the black pine (*Pinus nigra*) to some places near Fluminimaggiore on the west coast.

Macchia

Macchia is distributed throughout much of the island, but as a closed community mostly in the plains and hills. It occurs with some variations on all soils and shows no preference for any one kind of substratum, but is poorly developed or absent where there is exposure to strong winds. In typical well-developed macchia the following evergreen shrubs are essential constituents: mastic or lentisk, strawberry tree, myrtle (*Myrtus communis*), a buckthorn (*Rhamnus alaternus*), a gorse-like plant (*Calycotome spinosa*), and tree heath. The last sometimes forms almost pure communities, 9 to 12 feet tall, but avoids pure limestones. Woody or strong herbaceous climbing plants are sometimes frequent in macchia and bind the shrubs together, in some places making them impenetrable without mechanical aids. When tall macchia has been cut and the cutting is followed by more or less heavy grazing, or periodic cultivation, modified low and depauperated communities take its place. A common one in Sardinia is rock-rose macchia dominated by species of *Cistus*, *C. monspeliensis*, *C. salviifolius*, and *C. incanus* being the commonest on non-calcareous and *C. albidus* on calcareous soils. Typical examples of pure rock-rose macchia are found on the coastal stretch between Pula and Domus de Maria, on the plain between Decimomannu and Iglesias, on the low-lying area south of Oristano, and the plain between Alghero and Olmedo. *Cistus monspeliensis* and *C. salviifolius* have white flowers and *C. incanus* red flowers in full bloom by May. Para-

sitic on the roots of the rock-roses is the bright orange-yellow flowered *Cytinus hypocistis*. Further degeneration of macchia results in rock-heaths which are considered below.

Two other particularly interesting plants of the Sardinian macchia should be mentioned. A tree spurge (*Euphorbia dendroides*) occurs in full development only on the south of the island, especially in the Iglesiente and in the islands of S. Antioco and S. Pietro, but is scattered in many other parts. It forms nearly pure spurge communities in wind-protected depressions on the west side of S. Pietro, on the slope of the mountains between Iglesias and Gonnessa, as well as near Teulada and Pula. Its growth is sometimes bush-like with shoots showing mostly forked branching from the base, sometimes like a small tree, with smooth barrel-round stem and spherical crown whose yellow-green colour stands out from the dark macchia background. A height up to 16 feet has been recorded. The dwarf palm occurs in a few areas often in great numbers and sometimes in pure communities. Its chief range is in the Nurra, and the adjoining dry, stony, woodless lowland as far south as the slopes of the mountains south of Alghero. A second area is in S. Antioco island, where it is very frequent both in macchia and rock-heath. It is completely absent from S. Pietro. It also occurs in macchia and rock-heath on the east slope of M. Tuttavista. In growth the dwarf palm varies greatly. Sometimes it has a dwarf tree habit, sometimes a lax bush-growth, but most often it grows in flat, wavy, thick hummocks, 1½ to 2 feet tall with rigid leaves. Cattle eat it, especially the less rigid shade forms, with relish. It flowers freely in April.

In all types of macchia the shrubby plants are accompanied by a host of herbs and dwarf shrubs. Geophytes (earth plants with underground stems, tubers, corms, or bulbs) are very abundant and include a large number of terrestrial orchids, a fine gladiolus (*Gladiolus segetum*), and asphodel. Members of the pea family (such as species of *Trifolium*, *Medicago*, *Lathyrus*, *Lotus*, *Ornithopus*, and *Vicia*), the daisy family (*Bellis*, *Anthemis*, *Filago*, *Pulicaria*, *Carlina*, *Crupina*, *Hedynois*, *Urospermum*, &c.), and Umbellifers (*Dancus*, *Smyrniun*, and *Petroselinum*) are also characteristic together with a host of other annuals and perennials.

Rock-heaths

Rock-heaths are nearly always very degraded macchia areas from which the typical macchia shrubs have more or less disappeared. The rock-rose and dwarf palm communities, or some of them, might be

classified under this head. The most important typical rock-heath plants are Italian everlasting flower (*Helichrysum italicum*), brooms (*Genista* spp.), a subshrubby legume (*Dorycnium suffruticosum*), Spanish broom (*Spartium junceum*), a wormwood (*Artemisia arborescens*), spiny burnet, a heath (*Erica scoparia*), rosemary (*Rosmarinus officinalis*), a jointed fir (*Ephedra nebrodensis*), and hairy sparrow-wort (*Thymelaea hirsuta*), besides remnants of macchia species. The Italian everlasting flower is by far the most frequent of all the rock-heath plants. It forms, both in the plains and in the mountains, extensive grey-white communities which show golden yellow flower-heads in May and June. It is quite indifferent to the chemical nature of the soil. The rosemary is very common on calcareous soils, though not limited to them, and is the typical representative of the rock-heath flora in the limestone mountains.

A modified form of rock-heath is sometimes called rock-steppe. In it tuberous and bulbous plants play a great role. The most important and widespread of these is the asphodel, which sometimes forms almost pure communities, though later in the year it may be followed by a series of thistles. Another noteworthy bulbous species of these rock-heath or rock-steppe areas is a sea-lily (*Pancratium illyricum*). This is a fine plant with large white, sweetly scented flowers. It is particularly conspicuous on S. Pietro, on the coast near Portoscuso, near Alghero, on the limestone plateau of the Campo Donanigoro, and on the basalt plateau near Nurri, where the otherwise bare ground at flowering time is covered with white patches of *Pancratium* as far as the eye can reach.

Coastal Communities

Sand-dunes. The most important early colonists of sand-dunes are grasses, including marram grass (*Ammophila arenaria* subsp. *australis*), *Corynephorus articulatus*, and *Vulpia uniglumis*. The asphodel is also an early entrant. As the dunes become stabilized the flora becomes much richer by invasion of a large number of herbs and subshrubs and finally by the establishment of juniper and tamarisk (*Tamarix africana*) brushwood.

Strand-rocks. Much of the Sardinian coast is rocky and exposed to sea winds and salt spray. The vegetation on such rocks is generally open and composed largely of succulent-leaved plants including species of sea-lavender, sea-heath, a ragwort (*Senecio leucanthemifolius*), samphire, a plantain (*Plantago coronopus*), and golden samphire.

Salt Marshes. Behind dunes or at the margins of flat bays there are sometimes communities of plants of salt environments due to flooding by or permeation of salt water. The species are mainly halophytes (plants able to withstand high salt concentrations) with chenopods most important. Here there are species of glasswort, seablites (*Suaeda* spp.), saltwort (*Salsola soda*), sea purslane, sea plantain (*Plantago maritima*), and others of various families. These salt marshes pass imperceptibly into saline and brackish water swamps, the so-called 'stagni'. These have rushes (*Juncus* spp.), bulrushes (*Scirpus* spp.), tall reed grasses (*Arundo donax* and *Phragmites communis*), and, more occasionally, broad-leaved reed-mace (*Typha latifolia*).

Freshwater Swamps

Freshwater swamps are scattered in numerous small patches throughout the island. They are common along the whole south coast, also in the Campidano and the Tirso valley, on the east coast near Muravera, in the basalt district near Dorgali, in the Nurra, and especially in the Gallura, where the swamps of Asfossado by their floristic richness have achieved a certain renown. By midsummer most of the small water basins have dried up and shrunk into small evil-smelling pools which, like the stagni, are breeding-places for malaria-carrying mosquitoes. In open water there are numerous aquatics, such as pondweeds (*Potamogeton* spp.), duckweeds (*Lemna* spp.), water-lilies (*Nymphaea alba* and *Nuphar luteum*), and water-buttercups (*Ranunculus aquatilis*). Around the ponds are sometimes dense areas of marsh with reeds, rushes and sedges, and large numbers of freely flowering marsh species belonging to such genera as *Lythrum*, *Epilobium*, *Orchis*, *Iris*, *Oenanthe*, *Rumex*, *Butomus*, *Ranunculus*, *Spiranthes*, *Alisma*, and many others.

Inland Rock Communities

Much rock surface has been more or less laid bare by erosion. The absence or shallowness of the soil combined with close grazing has, in turn, prevented rejuvenation of woody communities, with the result that competition between plants has been much reduced and the flora is rich though the vegetation is poor. Three main subdivisions may be recognized: that of the pure limestones and dolomitic rocks of the east; that of the old rocks of the montane zones and of the metaliferous Palaeozoic limestone; and that of the old and schistose rocks of the high mountain zones.

The flora of the limestone and dolomitic rocks in the east of

Sardinia, and also the small island of Tavolara, is highly differentiated and contains many species of narrow range. Here there are rocky walls catching the sun and protecting against winds, clefts, grassy banks, deep gorges and valleys, stony stretches, and other diversifications of habitat. In this area there are especially noteworthy ferns and mosses and species of saxifrage, stonecrop, labiates, and composites. The Palaeozoic limestones of the south-west of the island are also rich in mosses whilst the granite of the Gallura is poorer. Gorge plants are particularly interesting and include a hellebore (*Helleborus lividus*), a borage (*Borago laxiflora*), a germander (*Teucrium massiliense*), and a ground-ivy (*Glechoma hederacea* var. *sardoa*). The high mountain zone is practically limited to M. Gennargentu with its highest peak, the Punta la Marmara (6,018 ft.). Here the rock flora shows a strange mixture of high alpine plants with some limited to the Mediterranean Region; for combined with the winter snowfall and cold winds there is summer heat and dryness. Again, the moss and liverwort flora is exceptionally rich for a Mediterranean land, and amongst flowering plants there are species of *Daphne*, *Silene*, *Sagina*, *Saxifraga*, *Sedum*, *Poterium*, *Lamium*, *Galium*, *Asperula*, *Carlina*, *Ruta*, *Rhamnus*, *Stachys*, and other genera.

Alpine Mats

In the districts of the highest peaks and massifs, particularly in the M. Gennargentu massif, where there is winter snow, matted communities of herbs and low-growing subshrubs occur locally. They generally flower early, some of the bulbous and tuberous plants even breaking the snow cover by their spring growth. Important plants of these mats are a thyme (*Thymus serpyllum* var. *herba-barona*), a thrift (*Armeria vulgaris* var. *sardoa*), a plantain (*Plantago subulata* var. *capitellata*), a violet (*Viola calcarata* var. *nebrodensis* and var. *corsica*), and a cinquefoil (*Potentilla rupestris* var. *pygmaea*). There are various intermediates between closed mats and more open cushion communities in windswept places.

ANIMAL LIFE

THE wild animals of Sardinia have been described incidentally among those of the mainland (I, pp. 467-70), but owing to their peculiar interest, more details are included here.¹ Some of the animals, like the wild sheep or mouflon, examples of which can be seen in the Zoological Museum at Cagliari University, and the Sardinian par-

¹ For a more complete account reference should be made to the *Atti del XII Congresso geografico italiano* (1935), pp. 208-236.

tridge, are so unusual, or are related to forms living in far distant countries, that naturalists have produced many and various theories of their isolation on the island. Many believe that these peculiar forms represent the kinds of animals, more or less modified, which reached the island before its separation from some neighbouring mainland, whereas those animals which are not found were either non-existent before separation, or were not living near enough to get to the island. There is, however, disagreement as to whether Sardinia was last joined to Europe or Africa.

The mouflon (*Ovis musimon*) is believed to belong to the original wild fauna of Corsica and Sardinia, and is found nowhere else in the world except where introduced by man as in the National Parks of Abruzzi and M. Circeo, on the island of Rhodes, and in Austria and Germany. It is related to an Asiatic type of wild sheep and was certainly living in Sardinia in classical times. Regarded by some as the original Golden Fleece, it may possibly have been introduced into the island by Greek colonists, but there is no definite proof of this. Its numbers in Sardinia have varied much during the last few centuries, but it is now protected in game reserves, including that near Golfo Aranci. The mouflon, which lives mostly on the mountains, but occasionally descends to the lower wooded slopes, can be crossed with domestic sheep.

Red deer, wild boars, hares, and several rodents, notably the variety *Crociodura russula ichnusae*, also differ from their relatives on the mainland, but not so distinctly as the wild sheep. Among the most distinctive carnivores are the Sardinian weasel (*Mustela boccamela*), which is unusually large, and a peculiar wild cat (*Felis ocreata*) with possible affinities in Tuscany, North Africa, and Crete. Among the domestic animals, the Sardinian donkeys are exceptionally small. In addition to these peculiar forms found in the island, the following animals, which might be expected to occur, are absent: bears, wolves, otters, squirrels, moles, and probably voles. Some of these may have existed in former times and have been exterminated by man. One animal, a small hare-like creature not much larger than a mouse, became extinct in historic times.

The Sardinian partridge (*Alectoris barbara*), which is unknown even in Corsica, or elsewhere in Europe, though found in Tunis, Algeria, and Morocco, is quoted by naturalists as evidence of the African origin of at least part of the Sardinian fauna. It is protected in the nature reserve at Golfo Aranci. The ordinary red-legged partridge, as well as other game birds, including snipe, pheasants, and

quails, are also found. As in the case of the mammals, the gaps in the fauna are as strange as its peculiarities, and birds which might be expected but are missing include the commonest kind of Italian sparrow, magpie, and more than one species of owl. A particular species of nuthatch found in Corsica is unknown in Sardinia.

Among the freshwater fish, a variety of trout occurs which is said to be related to forms found in Algeria, Asia Minor, and Persia. Only one species of lizard (*Lacerta fitzingeri*) is found in Sardinia. There are no vipers nor other poisonous snakes in the island, and the slow-worm and the smooth snake (*Coronella*) are also absent. All the common forms of newts are also missing, except one species (*Molge rusconi*), a north African form. Only one kind of toad (*Bufo viridis*) occurs, and nearly all the species of frogs and salamanders so common in the Mediterranean area are unknown in Sardinia.

The insects are of special interest to naturalists. For instance, out of more than 100 species of beetles, a large number have been greatly modified by their isolated geographical position, some having lost the power of flight. Among the butterflies and moths, at least 12 species are found nowhere else, in addition to a greater number which are restricted to the Corsica-Sardinia group. The insect fauna is a meagre representative of the much greater number found in neighbouring parts of Europe and Africa; the lack of suitable plants for food may account for some of the gaps, but some insects may have existed in the past and become extinct, and many probably have never lived on the island. Similarly out of 48 species of centipede-like animals, 6 are restricted to Sardinia. At the same time, a large number of genera which are abundant on the surrounding continents are absent.

Many land- and freshwater-snails have varieties claimed as peculiar to the island, some of which may be true species found nowhere else, and two genera at least (*Isselia* and *Tyrrheniberus*) are only known in Sardinia. On the other hand, many kinds of snails do not occur, including the common edible snail. In addition, certain kinds of worms are unique to the island, but in contrast to the mainland only one genus of earth-worm is found.

HISTORY

The Prehistoric Age

Sardinia, according to Greek legend, was founded by Iolaus, the nephew of Heracles, who before his death sent him thither, in charge of his two young sons. In some versions of the tale one of Heracles' sons

is called *Sardus* and gives his name to the island. All these stories have a strong African tradition. *Iolaus*, for example, is probably a Libyan god, whose name occurs in various African place-names. The core of truth which they contain appears to be that in Neolithic times and in the Bronze Age there were successive immigrations of Sardis from Africa, and that these are the earliest inhabitants of Sardinia who have left traces of their existence. They were a short dark race, with dark brown eyes and hair and long heads. This essentially north African type persists through the greater part of Sardinia to-day. Fair hair and blue or grey eyes are seen chiefly in the north, among settlements made at later periods by colonists from northern Italy.

The principal source of evidence with regard to the early inhabitants of Sardinia are the *nuraghi*. Some three to four thousand of these conical towers (Plate 49), with accessory buildings, are still to be seen scattered over the island, more especially in the mountainous interior. The earliest examples date, apparently, from the late Neolithic period and the greater number from the Bronze Age. They were once believed to be tombs, but are now generally held to have been built as abodes of the living rather than of the dead. The typical nuraghe is strongly placed on a hill commanding a wide prospect and yet near to water-supplies. It is built of unhewn stones, or, in later examples, of stones roughly dressed with bronze instruments. The entrance portal gives access to a corridor at the end of which is a round chamber with alcoves opening out of it, suitable for use as store-cupboards. On one side of the corridor, usually to the left, an uneven, winding staircase in the thickness of the wall gives access to the upper stories. The whole is enclosed in a thick cone of stone, often 60 feet in height when complete. Such a building appears to have been designed as the home of a chieftain, the seat of his authority, and a fortress against his enemies. The name nuraghe is probably derived from the Phoenician *nur* meaning 'fire', a word which suggests that it was used for signalling the alarm when Phoenician navigators appeared off the coasts. The other prehistoric monument peculiar to Sardinia, the so-called giant's tomb, is usually found in close proximity to a nuraghe. It consists of a chamber or cella, often 30 feet long, enclosed by slabs of stone and terminating in an apse. It was probably used mainly for burials of chieftains and their families, the bodies being placed within it in a squatting position. Of the two prevailing types of temple one is a rectangular cella on the mountain heights, with an altar and a table

for votive offerings, dedicated to the divinities of the heavens, the other is a well, covered with a cupola, dedicated to the mysterious deities of the underworld, who were venerated as the source of health and truth. Near these temples and in the rubbish heaps round the nuraghi a remarkable collection of bronzes has been found. Among them are statuettes, some 3 inches high, designed as votive offerings, sincere though rudimentary in concept and execution. The most numerous portray warriors, armed with swords, clubs and axes, or bows and arrows, with a round, convex shield fastened to the back. Others represent a hunter, carrying a bag of game over his shoulder, a shepherd in short skirt and girdle leaning on a tall club, a horn-blower with a large bull's horn, or a woman with a child on her lap. Taken as a whole the prehistoric remains of Sardinia tell of a people having considerable architectural skill, possessed of a variety of weapons and tools, and including cultivators as well as hunters and herdsman. Their government was feudal and they had some maritime trade. At a time when Italy was still sunk in barbarism, the Sards had attained a fairly high standard of civilization.

The Supremacy of Carthage

The history of Sardinia begins with the struggle between Greeks and Carthaginians for supremacy in the Tyrrhenian Sea, a struggle which culminated in the establishment of Carthaginian control over the island before the end of the sixth century B.C. It seems probable that, even earlier, a few Phoenician settlements had been planted on the coast and there is evidence of a Greek colony at Olbia (Terra-nova). Not until 560 B.C., however, was there any attempt on the part of Carthage at regular occupation of Sardinia. The first expedition was repulsed by the Sards, who defeated the Punic general and destroyed a large part of his army. In 537 a naval victory of the combined Carthaginian and Etruscan fleets over the Greeks forced the latter to give up attempts at colonization in Sardinia, and paved the way for the reduction of the island by Hasdrubal and Hamilcar. Although by about 510 B.C. the supremacy of the Carthaginians was acknowledged, their conquest of Sardinia was never more than partial. The greater part of the south and west was securely occupied. Towns such as Carales (Cagliari), Sulci (S. Antioco), Nora, and Tharros were Punic colonies, controlled by a commercial aristocracy, in which the Sards were reduced to the position of serfs, paying tribute from their crops, and liable to military service. But the Carthaginians did not penetrate into the interior and here the Sards



PLATE 47. *Ulassai at the eastern edge of Barbagia Seulo*

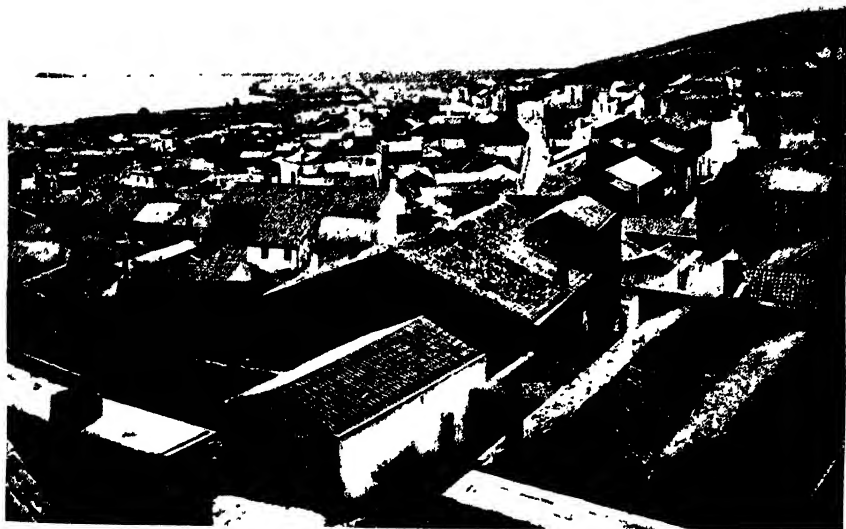


PLATE 48. *S. Antioco*



PLATE 49. *A Nuraghe at Terralba*

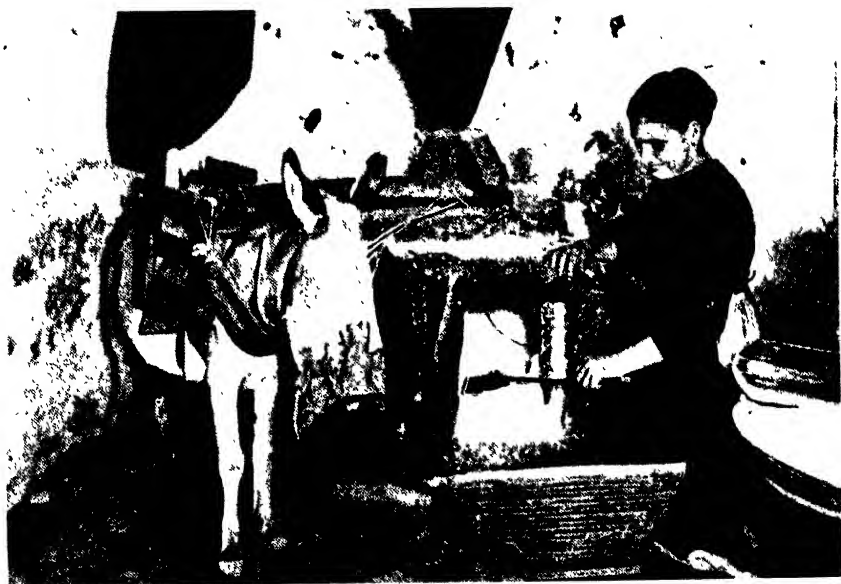


PLATE 50. *Flour mill in a Sardinian kitchen*

remained free in their mountain strongholds, their intercourse with the coast-dwellers being principally concerned with barter. Carthaginian policy with regard to Sardinia was one of exploitation, and their influence on its civilization was not very far-reaching. From the evidence of inscriptions, however, it is clear that the Punic language, and in a lesser degree the Greek, was firmly established in the more advanced parts of the island. By the beginning of the third century B.C., or possibly earlier, the eyes of Rome were turning towards Sardinia, and the attempt of the Romans to trade or settle there was strenuously opposed by Carthage. Open hostilities began in 259 B.C. when one of the Scipios, who was consul for the year, led an expedition to Sardinia, which was repulsed by the Carthaginian fleet. The Roman invasion of the following year met with temporary success, but Sardinia was still in Carthaginian hands at the end of the First Punic War. Soon afterwards a rebellion of Carthaginian mercenaries led to a native rising which gave Rome an opportunity to intervene and to occupy the coastal districts (238 B.C.). Thus Carthage lost control of Sardinia, which became a link in the Roman offensive and defensive system against Africa and Spain. The fact that Sardinia was in her possession accounts in large measure for the naval superiority of Rome in the Second Punic War.

Roman Sardinia

For nearly seven centuries Sardinia was a Roman province, playing its part in the course of Roman history and subject to the influence of Roman civilization. At first the Romans met with considerable resistance from the inhabitants of the coastal districts. The most formidable of these local risings had its centre at Cornas, and during the Second Punic War (215 B.C.) its leader Hampsicora formed an alliance with Carthage. Owing to the failure of the Carthaginian forces to arrive in time, the Roman commander was able to deal with the rebels and their allies separately and to inflict a crushing defeat upon them. In 210 B.C. there was another inroad on Sardinia from Carthage, but this was the last time a foreign army landed on the island until the coming of the Vandals in A.D. 455. The natives of the interior, however, long continued hostile. Conflicts between them and the Roman army usually ended in victory for the latter, and thousands of captured Sards were sold in the Roman slave-market. Yet these indomitable people remained unsubdued in their mountain homes, and the districts which they inhabited came to be known as *Barbagia*, or land of the barbarians. Horace writes of 'the fruitful

crops of rich Sardinia'. The island was valued by the Romans both for its corn supply and its lead and copper mines, but after the overthrow of Carthage its strategic importance diminished. Residence there was unpopular owing to the prevalence of malaria, and it was made to serve as a place of exile and punishment. The veil of obscurity in which it was wrapped was lifted for a moment in 54 B.C., when the governor Scaurus was charged with extorting triple tithes of corn from the landholders and other oppressions. His trial took place in Rome, where Cicero made a speech in his defence, holding up Sardinia to contempt as the only province which had no allies of Rome or free city, and stigmatizing its inhabitants as liars and traitors. A tradition of the island which attracted the notice of both Greek and Roman writers related to a peculiar herb, said to resemble parsley, which caused those who tasted it to die convulsed with 'sardonic' laughter.

Gradually Roman influence was extended throughout Sardinia. Caesar gave Carales (Cagliari) municipal rights. Turris Libysonis (Porto Torres) was probably a colony of his foundation. Sulci (S. Antioco) and Tharros (Arborea) were colonies of the early empire. Forum Traiani (Fordongianus) was a new Roman foundation on the Tirso and not, as other Roman centres, a one-time Punic settlement. Augustus organized the tribes of the interior as *civitates* and brought them under control. Carales became the capital and a system of roads radiated from it, one following the west coast to Porto Torres, another following the east coast to Terranova, and a third reaching Terranova by an inland route through the Gennargentu. A detachment of the fleet was stationed in the splendid harbour of Carales, and, despite the growing weakness of Rome, naval superiority kept Sardinia undisturbed by the Germanic invaders until the middle of the fifth century. Only after the Vandals were firmly planted in Africa did their leader Gaiseric make himself master of the island in 455.

The Coming of Christianity

The first Christians of whose presence in Sardinia there is trustworthy evidence were those sent there as a punishment to work in the mines. This was towards the end of the second century, when the Church in Rome made a practice of sending relief to them in their sufferings. From these humble beginnings the Christian faith won a firm footing in the island. Some distinguished Christians came to Sardinia as exiles, bishoprics were established, and the Bishop of Carales was present at the Council of Arles (314). During the Arian

controversy Lucifer, Bishop of Carales, was an effective champion of orthodoxy, winning praise from Athanasius as a 'true Lucifer, who, bringing the light of truth, set it on a stand to shine before all'. The Vandals, like the Romans, made Sardinia a place of exile. While deported Moorish rebels took to the mountains and strengthened the elements of unrest, priests and bishops from Africa, persecuted for their refusal to accept Arianism, developed the intellectual activity of the Sardinian Church. A Sardinian priest, Hilarius, was elected Pope in 461, and a little later Fulgentius of Carthage founded a monastery outside Carales and himself produced several theological works. In 534, Belisarius sent one of his captains who succeeded in recapturing Sardinia for the empire. The Vandals had troubled themselves little over the administration of the island, and the Byzantines found themselves in possession of a province in which the predatory activity of the mountain tribes had revived and the chief force making for stability was the Church. Among the principal benefactors of Sardinia was Pope Gregory the Great (590-604), whose letters show unremitting care for the spiritual and temporal well-being of the inhabitants. He sent missionaries to the mountain tribes to reclaim them from barbarism and idolatry. He promoted the foundation of new monasteries. He sent an envoy to inquire into complaints as to the oppressions of the military governor, with instructions to report direct to the emperor in Constantinople; he provided for the fortification of Carales against attacks from the Lombards. Thanks to him and to the valour of the Sards themselves, the Lombards were never able to conquer the island, and under the aegis of a powerful Church a measure of unity and civilization prevailed throughout its borders.

The Four Sardinian Judges

Under the Byzantines Sardinia formed one of the seven provinces subject to the exarch of Africa. It had a civil governor, resident at Cagliari, and a military governor, with his headquarters at Forum Traiani; between them raged perpetual conflict which ended in the complete absorption of the civil authority in the military. From the beginning of the eighth century, when Africa had fallen to the Saracens and Sardinia was subject to unremitting attack from these new enemies, the governorship tended to become hereditary in the hands of a native prince. As the grip of the empire on its western provinces weakened, the imperial representative became a ruler in his own right and Sardinia was in practice independent. Emancipation from Byzantium was followed by the division of the island into four

separate *giudicati*, Cagliari in the south, Arborea in the centre, Logudoro or Torres in the north-west, and Gallura in the north-east. Each was ruled by a judge, possessed of practically absolute power, whose office became hereditary. If there were no male heirs, the daughters inherited, and their rights were exercised by their husbands. Quarrels within the reigning families and feuds between the judges over the boundaries of their dominions, intermingled with the rival efforts of Pisa and Genoa to establish a commercial monopoly in the island, form the recurring theme of Sardinian mediæval history.

Sardinia had been exposed to intermittent raids from the Saracens for 300 years when in 1015 Mogahid set sail from Spain with 1,000 horses and 120 ships and reduced the whole island. A year later Sardinia was rescued by the combined Pisan and Genoese fleets, and the Saracens departed, never to return. The victory, as an inscription on the façade of the cathedral of Pisa records, placed the Sardinians for ever in Pisa's debt, but it was a debt from which the Pisans derived rich interest. Treaties of alliance were made with the Sardinian judges which included wide commercial privileges, and Pisan colonies were established at Cagliari and elsewhere. In 1078 Pope Gregory VII appointed the Bishop of Pisa as his legate in Sardinia, thus recognizing and strengthening the hold of the Pisans over the island. The commercial hegemony enjoyed by the Pisans was naturally resented by the Genoese, who had shared in the victory over the Saracens but had not received a like reward. The struggle between the two Powers raged throughout the twelfth and thirteenth centuries, drawing into its vortex not only the dynastic rivalries of the Sardinian judges but the contest between Empire and Papacy.

The enmity between Genoa and Pisa was exploited by the Sardinians both to preserve their independence and to further the ambitions of individuals. In this respect the career of Barisone, judge of Arborea (1145-1185), forms a typical chapter in Sardinian history. His predecessor had been deposed by the Archbishop of Pisa (now a metropolitan) acting in his capacity of legate, and Barisone was at first the ally of Pisa. When, however, he took part in a disputed succession to the judgeship of Cagliari and Pisa supported his rival, he turned to the Genoese and, with their aid, secured the investiture of Sardinia from the Emperor Frederick Barbarossa. In 1164 he was crowned King of Sardinia at Pavia, but when he appeared off Arborea, escorted by Genoese ships, his subjects refused to allow him to land. Barisone's inability to pay the 4,000 ducats which he had promised, and the larger offers of the Pisans, induced Barbarossa to revoke his

investiture and to grant the dominion of Sardinia to the commune of Pisa (1165). This was no more acceptable to the islanders than the rule of Genoa through a puppet king, and it at once called forth a protest from the Pope, that the emperor had no right to dispose of territory subject to the Church. A final award of the emperor in 1175 by which Sardinia was divided between Pisa and Genoa was merely a recognition of facts. Pisan influence, at that time, predominated in two of the judgeships and that of Genoa in the other two.

Rivalry between Pisa and Genoa

The aims of both Pisa and Genoa with regard to Sardinia were at first limited to commercial supremacy, which they hoped to achieve through alliances with the native rulers. The judges, however, proved untrustworthy allies and more direct methods of acquiring power were adopted. In 1205 a Pisan citizen, Lamberto Visconti, married the heiress of Gallura, and founded a dynasty of judges which lasted for nearly a century. Members of the Genoese house of Doria, by successive marriages with daughters of the ruling house of Logudoro, acquired wide lands in the district and built a castle dominating the coast near Porto Torres. Early in the thirteenth century the Pisans built a castle at Cagliari, which city became the centre of their power as, in the course of the century, Sassari became the stronghold of Genoese influence. Pope and emperor also continued to vie with each other for supremacy over Sardinia. In 1237 Honorius III forced the judges to acknowledge that they held office in the name of the Church. Shortly afterwards Adelasia of Gallura and Logudoro married Frederick II's son Enzo, and Imperial Vicars were sent to administer all Sardinia in his name. Innocent IV granted Adelasia a divorce and on her death she left her rights to the Church. By the end of the century three of the independent judgeships had ceased to exist and that of Arborea alone remained. Administrative authority lay for the most part in the hands of Pisan officials. Pisa had come very near to the establishment of political supremacy throughout Sardinia, when her defeat by Genoa at Meloria (1284) struck a blow at her maritime power from which she never recovered. In 1297 Boniface VIII, desirous of bringing peace to Sardinia by bringing it under the control of a single monarch, granted it together with Corsica to James of Aragon in return for the cession of his claim to Sicily (II, p. 47). By so doing he opened a new phase in Sardinian history.

Three centuries of Pisan and Genoese penetration brought Sardinia within the orbit of Italian civilization. Trading colonies inspired

cities such as Cagliari and Sassari with the ideals of the Italian commune and legislation in favour of the trading classes set limits to the power of the judges. Monks settled in the island from Monte Cassino, Camaldoli, Vallombrosa, and other Italian monasteries, founding churches and convents on the model of their mother houses and raising the economic life of the country by clearing forests and developing agriculture. Among outstanding examples of Pisan influence upon ecclesiastical and military architecture are the ancient basilica of Sta. Giusta near Oristano, and the Torre del Elefante at Cagliari. With the coming of the Aragonese a fresh set of influences were brought to bear upon the island. From the fourteenth to the eighteenth century the ties with Italy were gradually loosened and Spanish civilization became the dominating factor in Sardinian life.

The Aragonese Conquest

For some years James of Aragon made no attempt to conquer his new dominion. Pisa busied herself in strengthening the defences of Cagliari, and James prepared for the attack by allying with the Doria family. In 1323 an Aragonese fleet appeared off Cagliari and the city surrendered in the following year. At first Pisa was allowed to hold it as a fief, but in 1326 she was compelled to forfeit all her rights there. Henceforth opposition to Aragonese rule centred in the Judges of Arborea and the Doria, hitherto James's faithful supporters. Mariano IV of Arborea carried on intermittent war with Aragon. After his first rebellion in 1354 Alghero, a port founded by the Genoese, was colonized by Catalans and a Cortes on the Spanish model was summoned to reform the administration of the island. A new insurrection broke out in 1368, when the Aragonese commander was killed, and Mariano occupied the whole of Logudoro, forcing his enemies to retire upon Alghero and Cagliari. After his death the struggle for independence was carried on by his daughter Eleanora, and her husband Brancaleone Doria. Eleanora is Sardinia's national heroine, famed alike as a military leader and a jurist. In 1395 she promulgated a code of laws known as the Carta di Logu which became the law of all Sardinia. Until her death in 1404 her capital of Oristano was the centre of active resistance to foreign rule. The subjection of Sardinia was not accomplished until Alfonso of Aragon came there in person in 1420 and overthrew the remaining strongholds of independence. In an attempt to pacify his opponents Eleanora's descendants were made Marquises of Oristano and a Cortes held under Alfonso's presidency adopted the Carta di Logu as the law of the land. Nevertheless the

native princes, the communes, the Pisans, and the Genoese continued to foment disturbance. A rising of the house of Arborea led in 1478 to the suppression of the marquisate of Oristano, and in 1527 Andrea Doria landed with 4,000 French on the island and took Sassari which he succeeded in holding for a year. In the face of these difficulties the Spaniards adopted a policy of concession to their own feudatories. Thus a privileged class grew up which monopolized control of the island and exploited it for their private ends. The Spanish Crown was not unmindful of Sardinian interests. At the head of the Government was the Viceroy, but he was expected to summon a Cortes every ten years. Philip II founded the universities of Cagliari and Sassari, prohibited the bestowal of the principal benefices upon foreigners, and gave protection to agriculture. Yet the Government could not break the power of the Spanish aristocracy, and under the reactionary regime with which they were identified Sardinia was left neglected and oppressed—a half forgotten island.

Sardinia under the House of Savoy

In the war of the Spanish succession the Sardinian nobles were, characteristically, divided between the Spanish and Austrian parties. The triumph of the latter was implemented by English aid, Cagliari being bombarded by Admiral Lake in 1708, and forced to yield. Already, before Sardinia had been assigned to Austria by the Treaty of Utrecht (1713), its Supreme Council had been transferred from Madrid to Vienna. Four years later Sardinia was made the jumping-off point of the attempt of Philip V of Spain's Italian minister, Alberoni, to upset the Treaty of Utrecht and restore to Spain her lost Italian possessions. A squadron set sail from Barcelona for the conquest of the island, and meeting with little opposition, was soon in possession. The seizure of Sardinia was followed by that of Sicily, but Alberoni's schemes were overridden by the Great Powers. In 1720 Sicily was united with Naples under Austrian rule and Victor Amadeus II of Savoy was compensated for the loss of Sicily by becoming king of Sardinia. The new monarchs took intelligent interest in their titular dominion and worked to establish royal authority over the two most powerful elements in the island, the feudatories and the Church. By the accord of 1726 Pope Benedict XIII confirmed the king in his right of presentation to bishoprics, and yielded his own prerogative of investiture in favour of the Crown. A century later, in 1836, Charles Albert struck the final blow against the political power of feudalism by abolishing feudal dues and jurisdiction. Much was

done both in the eighteenth and nineteenth centuries with a view to the improvement of social conditions. Schools of Italian were opened, waste land was reclaimed by Italian colonists, marshes were drained, and hospitals were founded. Yet, as always in the history of Sardinia, reforms were imposed from above by alien rulers rather than carried out by the Sards themselves. Although the island defended itself gallantly against the French and became the refuge of the kings when all Piedmont was under the heel of Napoleon, the spirit of the revolution was active within its borders. The people found a leader in Gian Maria Angioi, whose anti-feudal programme was coupled with a desire for independence to be brought about, apparently, with French aid. Risings took place in various towns and the Viceroy was driven from Cagliari, but the popular party was not able to stand up against both the Crown and the aristocracy, and Angioi was forced to fly, leaving behind him a legacy of discontent and unrest (1796).

No one worked more consistently for reform in Sardinia than Charles Albert (1831-1849). A visit to the island before his accession had convinced him that the abolition of feudalism was the necessary preliminary to any radical improvement. Twice over as monarch, in 1841 and 1843, he made a tour of the principal cities, noting with pleasure the great improvement in agricultural and other changes for the better that had already been accomplished and at the same time recording in his diary that much remained to be done. Between the two visits, Carlo di Villahermosa, a Sardinian noble who had entertained him on his model farm at Orri, wrote him reports on the condition of Sardinia, which, while reflecting the prejudices of the aristocracy, indicate plainly enough that Charles Albert's reforms had not brought about a golden age. Justice, he complained, was slower, more expensive, and more corrupt than under the feudal regime. High tariffs impeded the introduction of agricultural machinery and made farming unprofitable. Many bishoprics were left vacant. The old families were deprived of public influence and their place taken by a crowd of Piedmontese lawyers and bureaucrats, who considered themselves called to civilize Sardinia by means of the destruction of its entire social fabric. As in Roman times, Sardinia easily became a prey to corrupt officials, who looked on their sojourn there in the light of exile. Nevertheless a Sardinian historian can write of Charles Albert's work as 'reparation for the past, preparation for the future and a bridge stretching from the old to the new'. When in 1861 Victor Emmanuel II exchanged the title of King of Sardinia for that of King of Italy, Sardinia was already an integral part of the new realm. In

1847, on the petition of the island assembly, Sardinian autonomy was abolished and a Sardinian representative was chosen to attend the Parliament summoned under the famous Statuto of 1848.

Sardinia in Modern Times

During the latter half of the nineteenth century, English capital and English enterprise were operative in Sardinia. In 1862 an English company began the main railway, not without protests as to the danger of bringing the agelong rivals, Sassari and Cagliari, within a day's journey of one another. The number of English engineers and managers employed in the mining district of Iglesias produced a play upon its name, as a place that should properly be called 'Ingle-sias'. The Italian Government, however, had little time or money to spend upon Sardinia, and at the beginning of the present century it was still backward, lawless, and undeveloped. It thus became a promising field for Fascist activity, and a programme was drawn up which aimed at the development of the entire resources of the island. This included the harnessing of its four principal rivers for the supply of electricity and irrigation works, the draining of marsh lands, the development of agriculture and education, the suppression of brigandry, and the organization of the tourist industry. Although much of this vast scheme existed only on paper, a great deal was accomplished. The huge Tirso dam, in the neighbourhood of Fordongianus, and another on the F. Coghinias were completed before 1930. The year 1928 saw the inauguration of the agricultural colony of Mussolinia in the once malarious district near Terralba on the west coast. Forests were planted, many schools were built, and the Agricultural Credit Bank with its headquarters at Sassari stimulated agriculture. Apart from the considerable practical reforms which were effected, the interest taken by the Government in Sardinia and the publicity given to it, after centuries of exploitation and neglect, gave the Sardinians a new confidence in themselves and their future. A nineteenth-century poet and man of letters epitomized the history of his native land in a sonnet of which the English rendering is as follows:

'Phoenicians, Greeks and Africans made her their prey and built the nuraghi. Carthaginians tried to make the most out of her. The Romans contented themselves with keeping her in slavery. The Vandals, the Greek emperors and the Moors worked her complete ruin. Under the Pisans she had monks and lords, but Genoa, the usurer, treated her as a vile servant. The Aragonese gave her feudatories. Spain kindled petty jealousies and

asked for gold. Piedmont ruled over her between altar and gibbet. She was French and German, now she is Italian. But if God does not save her, who knows what she will become!

For the Sardinian of the twentieth century, the outlook is less gloomy, for the horizon is tinged by hope.

AGRICULTURE AND FISHERIES

AGRICULTURE

ENVIRONMENTAL and historical factors have combined to retard the development of agriculture, which is usually 'extensive' in character (III, p. 29, footnote) and supports a comparatively small population (p. 605). The island is mainly hilly or mountainous and there is comparatively little level surface suitable for ploughing. The Campidano (p. 528), which contains most of the arable land, is the only lowland of any size. Sardinia, like Sicily, suffers from an extreme form of the Mediterranean type of climate, characterized by strong winds, a small rainfall, and a prolonged and severe summer drought. The rivers in winter become wild and destructive torrents, which until recently no attempt had been made to control. Owing to the rapidity of the run-off over impermeable rocks, unhealthy malarial swamps, now partly drained, cover wide areas near the mouths of the larger rivers. In contrast the long, hot summers are rainless, and the watercourses generally dry up completely owing to the high rate of evaporation, which is accelerated by strong winds. The traditional way of life neglects arable farming and concentrates on livestock, especially sheep and goats. Formerly the island was well wooded, but unrestricted cutting and grazing have led to the spread of macchia, rock-heath, and rock-steppe (p. 552). In recent years, however, some attempts have been made to improve the value of the land by various irrigation and drainage schemes (p. 588). An outstanding example was the creation of the vast artificial Lake Omodeo on the F. Tirso, the object of which was not only hydro-electric power (p. 604) but also irrigation (p. 601). The regulation of the river in its lower reaches formed part of a reclamation scheme, the first-fruits of which were the laying out of farmsteads in the neighbourhood of the new agricultural settlement of Mussolinia. Sardinian agriculture is, however, still greatly handicapped by geographical isolation and by the persistence of a system which has its roots in feudal practices, as well as by a lack of capital to further the spread of modern farming methods.

Not only is the standard of animal husbandry generally low, but owing to the primitive methods still in use, crop yields are almost everywhere much below the average for Italy. There is comparatively little of the intensive mixed agriculture of the more fertile districts of the mainland.

Land Utilization

Despite the large proportion of hills, plateaux, and mountains in Sardinia, little ($3\frac{1}{2}\%$) of the surface is classified as unproductive. On the other hand, the amount of productive but uncultivated land is remarkably high (17%; Italy 6%). Nearly one-half of the island consists of permanent grazing (Italy $14\frac{1}{2}\%$), and only one-quarter is arable (Italy 40%). Tree crops occupy only about $2\frac{1}{2}$ per cent., (Italy $7\frac{1}{2}\%$) of the surface, while forest and chestnut groves cover 5 per cent. (Italy 18%).

Land Tenure

As might be expected in view of the smaller relative population, the average size of agricultural holding is larger than on the mainland, and very large holdings (e.g. over 250 acres) are both more numerous and cover a larger area, particularly in the northern parts of the island. There are too many very small land-holders, whose livelihoods are precarious and must be supplemented from other sources, such as labour on larger estates. The social evil of the great disparity of holdings is, however, much mitigated by the large communal estates, on which the smallholders often have rights, particularly grazing rights, and which include most of the rough grazing land. On both the communal lands and the *latifundia* (III, p. 9) smallholders are usually freely permitted to clear and plough small patches, which are sown with wheat for a year or two and subsequently relapse into pasture. The rights of grazing on communal pastures have been preserved since feudal times. Not until the Spanish occupation, which lasted from the fourteenth to the early eighteenth century, was the private ownership of land recognized, although the temporary enclosure of arable strips (known as *viddaxoni*) near the village was permitted. Eventually the whole of the pasture land (or *pardu*) near the village became shared out by the lords as private freeholds on which a more intensive agriculture was attempted. The land, however, was sown with cereals for only 1 or 2 years and then became part of the common grazing land for the following 8 to 10 years. Servitudes, such as compulsory work in the fields, were not abolished until the

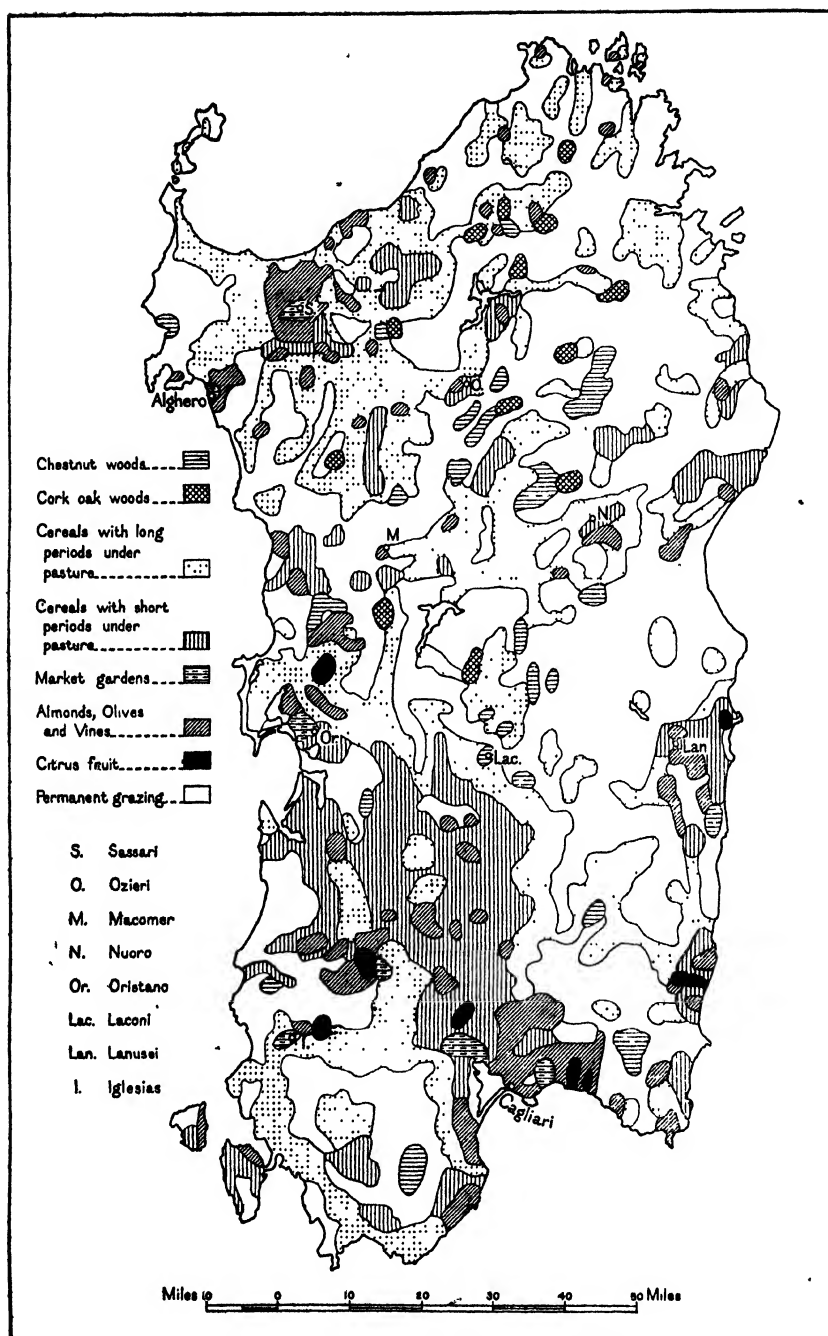


FIG. 47. Land Utilization of Sardinia

nineteenth century, but some feudal customs still survive, though not by law.

Size of holding (acres)	Sardinia		Italy	
	Number %	Acreage %	Number %	Acreage %
Less than 1½	17.5	0.3	21.7	0.8
1½-2½	12.2	0.6	13.9	1.7
2½-7	25.0	2.9	30.3	9.1
7-12	10.6	2.6	12.7	8.0
12-25	11.8	5.1	11.7	13.3
25-50	9.5	8.2	6.1	13.6
50-125	7.6	14.6	2.5	12.2
125-250	3.2	13.9	0.5	6.8
250-1,250	2.3	25.8	0.4	13.3
Over 1,250	0.2	26.0	0.1	21.4

As much as 60 per cent. of the farmers, and also of the farm acreage, belongs to owner-occupiers (III, p. 12). In this category are included both peasant cultivators of small much subdivided holdings (17,646 less than 1½ acres) and the owners of large estates, who as in Sicily and elsewhere, need hired labour on their farms.

Crops (Fig. 47) .

The principal cultivated products are cereals (normally wheat), grapes, and olives, all of which are grown in somewhat limited quantities. Other tree-crops, such as citrus fruits, peachs, pears, quinces, apples, and almonds, are grown in even more restricted areas, usually in association with ground crops (*coltura promiscua*, III, p. 36), which besides cereals include vegetables and leguminous crops. In addition there is a very small production of flax and tobacco, which are utilized locally. Livestock, despite the almost total absence of both natural and artificial meadows, is of far greater importance than crops. Cattle and pigs are subordinate to sheep and goats, which are grazed in vast numbers on the rough pastures of the hilly and mountainous regions of the interior. Appendix I (Tables 4-13) in Vol. III contains details of the acreage and production of the various crops for 1938 together with the numbers of animals for March of the same year. From these details it is apparent that, except in stock-raising, Sardinian agriculture occupies a low position in the total Italian economy.

Cereals. Wheat, the basic food of the Sardinian people, can be grown to an upper limit of at least 3,250 feet and is in practice sown

on nearly half the arable land. The chief areas of production are the lowlands in Cagliari province, especially the broad alluvial plain of the Campidano, where the relatively high yields and great acreage are probably due to the more favourable climate and relief. Also important for wheat are the adjoining hill regions of the Arborea, Marmilla, and Trexenta. The better yields obtained in all these districts during recent years have followed the increasing use of selected seed, in particular early ripening varieties, and chemical manures, and also the introduction of farm machinery. Another area favourable to wheat-growing are the basalt plateaux to the north of the Tirso, although in some districts the valley floors are badly drained. In Sassari province the chief wheat producing area is around Sassari itself, while in Nuoro province there is a small but notable cereal area in Ogliastra near Tortoli. The relative importance of wheat in the three provinces is indicated in the following table:

Average acreage and production of wheat, 1937-1940

<i>Province</i>	<i>Acreage</i>	<i>Production</i> (metric tons)	<i>Yield</i> (tons per acre)
Cagliari . .	283,000	113,000	0.39
Nuoro . .	130,000	47,000	0.35
Sassari . .	202,000	78,000	0.38
Sardinia . .	<u>615,000</u>	<u>238,000</u>	<u>0.38</u>

On account of the long dry summers most of the wheat grown in Sardinia is of the hard (*durum*) type (III, p. 29), and is used both for bread and pasta. The low rainfall, together with the poor soils and generally primitive methods of farming, result in a yield which is much below the average for Italy. Milling facilities are not well developed owing to lack of organization, and in many areas the peasants still use primitive grindstones. Part of the harvest is exported, and flour milled from softer varieties is received in-exchange. This is sometimes regarded as an artificial device whereby the price of bread is increased. Although in the past Sardinia, like Sicily, supplied much wheat to the Italian mainland, the amount grown to-day is little more than sufficient for home needs and forms only about 3 per cent. of the total crop. Attempts were made by the Fascists to control production, but in practice the peasants managed to evade the regulations.

Barley is grown mainly to provide fodder for animals (oxen, horses, pigs). The principal areas of production are in the east of the island. The granite soils of the Barbagia and Gallura are particularly suitable.

In both these districts more than 20 per cent. of the productive land is devoted to this cereal, a proportion higher than that in any part of the Italian mainland. The yield, however, is not more than the average for the whole country. In 1938 barley grown in Sardinia amounted to 29,000 tons (12% of the total for Italy). The cultivation of oats is a comparatively recent development in the island, and the practice appears to be spreading. The principal producing areas are in the Campidano plain and in Gallura, but yields are highest in the upper Tirso basin. A little maize is grown under irrigation, principally in the interior valleys. Practically the entire crop is of the *maggengo* or spring variety (III, p. 32); the quick-ripening *cinquantino* is also grown, but in restricted areas in the Campidano, where, however, both acreage and yields are small. The total production of maize in 1938 amounted to only about 6,000 tons (0.2% of the total for Italy).

Fruits. The vine occupies a relatively important position in Sardinian agriculture, though in 1936-1938 the output of grapes averaged only 2 per cent. of the total for Italy. Although it is climatically possible to grow the vine to an upper limit of nearly 3,000 feet, the more important vineyards are on the edges of the lowlands, particularly in the province of Cagliari. Throughout the island the vine is grown in vineyards (*coltura specializzata*), and but little in association with other fruits or with ground crops. In the Campidano vines are planted without support, but are pruned to prevent the grapes from touching the ground. Typical areas of production are to the north-east of Cagliari and to the south of Oristano in the Campidano, near Bosa on the west coast, and in Ogliastra and the Oliena district near the east coast. The vineyards of Sardinia, like those of the Italian mainland, suffered the ravages of the phylloxera (III, p. 37). This disease appeared first in the north of the island and by 1894 almost half the vines near Sassari had been destroyed; the Oliena district was also badly affected, Ogliastra least so. In the province of Sassari one-third of the former flourishing vine area has now been restored with the help of American vine stocks. The introduction of non-native vines has resulted in a wine which keeps less well, so that exports to the mainland have almost stopped.

There is, generally speaking, no large-scale production of wine in Sardinia, largely because of its poor keeping qualities and the general absence of storage cellars. The local wines are often highly alcoholic, and sometimes distinctly potent and treacherous, affecting the legs rather than the head. The traditional method of pressing grapes, still

followed in some districts, consists of placing on rocky ground sacks containing the grapes, which are then trodden underfoot. Both red and white wines of good quality, as well as liqueur wines, are produced in various well-known districts. In addition to types known as *malvasia*, *vernaccia*, *monica*, *moscato*, &c., wines of the best quality include those of the *Oliena*, *Lanusei*, *Ierzu*, *Iglesias*, and *S. Antioco* districts. The production of table grapes and raisins is of greatest importance in the south of the island.

The olive in Sardinia grows normally to an upper limit of approximately 2,300 feet, although in protected valleys this may be exceeded by about 300 feet. In 1938 the production of olives amounted to 43,000 tons, equivalent to roughly 4 per cent. of the total for Italy. More than one-third of the olive acreage consisted of specialized groves. Sardinia is climatically very suitable to the olive, which in places yields an exceptional harvest, but large plantations are restricted to certain areas, mostly in Sassari province. The best quality oil is obtained from the north-west, especially from Sassari and Alghero. Other notable olive districts are near Bosa on the west coast, in the neighbourhood of Cuglieri on the north of M. Ferru, and in Gallura and the Iglesiente. Olives are also grown in a few valleys of eastern Sardinia, especially around Oliena. The Nuoro district could, with less primitive methods of extraction, produce more oil. The practice of grafting wild olives, which are ubiquitous in the Mediterranean zone of vegetation (p. 549), has been spreading in recent years. A greater concentration on olive growing is, however, handicapped by taxation, so that a fairly large capital outlay is required by the prospective farmer.

Citrus fruits, first introduced into Sardinia by the Saracens, are to-day of little importance, partly owing to neglect and partly to frequent attacks by insect pests. Oranges are grown in sheltered localities in widely separated districts, in the neighbourhood of Milis, Tortoli, Muravera, Fluminimaggiore, and Bosa, along the west side of the Campidano, which is protected from strong west winds by the mountains of the Iglesiente, and in narrow valleys near Sassari. Specialized groves occupy only about one-third of the total orange acreage. Production in 1938 amounted to 5,000 tons (1½% of the total for Italy). In addition, other citrus fruits (lemons, tangerines, chinotts, bergamots) are cultivated on a very small scale, as for example near Bosa.

Peaches, apricots, pears, apples, quinces, figs, pomegranates, cherries, and plums grow almost everywhere in the neighbourhood



PLATE 51. *Wheat threshing in the Campidano*



PLATE 52. *Pigsties in the hillside below Tempio Pausania*



PLATE 53. *A Sardinian goat*



PLATE 54. *Ox waggon on S. Pietro Island*

of the villages. Production is, however, on a small scale and the quality of the fruit is not high. Pears, which come first in order of importance, are grown principally in the north near Oschiri and Nuoro, while peaches are fairly important in Barbagia and Ogliastra. Quinces and pomegranates are grown mainly in an area around Nuoro and in the Campidano, and apples, cherries, and figs in the Oschiri neighbourhood. Plums are fairly important in the Barbagia and around Sassari.

Nuts. Almonds are important in Sardinia, which in 1938 was third among the compartments of Italy in order of production, though far behind the first two (Sicily, 53%; Apulia, 38%; Sardinia, 4%). The commercial cultivation of the almond is limited to a few centres, such as Cagliari, Muravera, Villasimius, and Villacidro. Walnuts and hazel nuts, which are grown only to a limited extent, are to be found more particularly in the mountainous parts of the interior. Chestnut trees, whose upper limit is about 3,600 feet, are restricted to the Sarcidano, the west side of the M. Gennargentu (especially near Aritzo, Desulo, Ovodda, and Tonara), a small area on the slopes of M. Ferru, and here and there in Gallura; the trees, however, are of little economic importance.

Horticulture. Market gardening is of greatest importance on irrigated land in the lowlands, especially around the villages of the Campidano. The vegetables are of great variety, but for the most part the output is small, though presumably sufficient for local needs. The chief market-gardening centres are Cagliari and Sassari, but field cultivation (*colture ortensi da pieno campo*, III, p. 49) is more important both in acreage and production. The main crops are tomatoes, broad beans, and Jerusalem artichokes; of less importance are melons, cauliflowers, cabbages, and peas. Potatoes are grown in the mountains to supplement cereals, and also in the lowlands around Sassari, but the total production of the island is insufficient for the requirements of the population.

Industrial Crops. Industrial crops are of little account. Flax, mainly for fibre, is grown in the province of Cagliari, especially in the middle Tirso basin, and tobacco-growing is of some note around Sassari and in the extreme south-east of the island.

Fodder Crops and Pasture. Owing to the adverse physical and climatic conditions, especially the prolonged summer drought, good meadowland is very scanty, nor are rotation fodder crops of importance. In 1930, of the whole area of Sardinia, 34 per cent. (Italy 28%) was under grazing and fodder crops. Among the mountains this

proportion was as high as 46 per cent., and in the plain 48 per cent.; in the hills it was only 27 per cent. Nearly the whole (80-90%) of this proportion was permanent pasture or grazing. It is not surprising, therefore, that dairy herds are comparatively few in number. The natural grasses, even in the lowlands, tend to be coarse, although in recent years some efforts have been made to improve their quality by the use of natural or chemical manures or by sowing better varieties of seed. There is now an increasing production in some districts of fodder crops, such as lucerne, barley, *sulla* (Spanish sainfoin), and carrots. On the other hand, permanent pastures, mostly rough grazing (including heath, *macchia*, and degenerated woodland), cover vast areas of the island and form the home of many nomadic sheep and goats.

Livestock

Animals, in contrast to most other Mediterranean lands, occupy the chief position in the farm economy and have, in fact, formed the principal source of wealth from earliest times. The concentration on livestock has been largely due to the mountainous relief, the unfavourable climate, and the preponderance of rough grazing land, so that arable farming in many parts is regarded rather as an adjunct to the pastoral, or, in other words, the land has often been brought under the plough merely to improve the quality of the grazing. Since the amount of rich pasture is very limited, by far the most important animals are the sheep and the goat, though the ratio of cattle to population is higher than for Italy as a whole (Sardinia 22%, Italy 19%).

The following table indicates changes in the number of animals in Sardinia between 1864 and 1938:

	1864 ¹	1875 ¹	1881	1908	1918	1930	1938
Horses .	58,314	46,019	64,801	56,626	58,060	55,818	44,000
Donkeys .	..	27,695	31,981	32,871	37,601	45,452	44,000
Mules, &c. .	..	385	199	317	366	421	1,000
Cattle .	281,792	174,553	279,403	376,606	336,669	240,564	209,000
Buffaloes .	..	8	35	134	..	..	..
Pigs .	160,230	81,384	60,347	158,022	104,982	102,063	125,000
Sheep .	922,636	559,902	844,851	1,876,741	2,018,612	2,054,138	1,974,000
Goats .	498,948	234,104	261,531	506,966	633,058	436,202	392,000
Total .	1,929,920	1,122,050	1,543,148	3,008,283	3,190,248	2,934,658	2,729,000

¹ Estimates are probably too high.

² Estimates are probably too low.

Between 1908 and 1930 the largest increase in horses and sheep was in the mountain areas, which also showed the smallest decrease in the

number of cattle and goats, but the largest in pigs. The lowlands in the same period had the least increase in sheep and the biggest decline in cattle and goats.

Increase or Decrease (—) per cent. in the Number of Animals, 1908–1930

	<i>Horses, mules, &c.</i>	<i>Cattle</i>	<i>Pigs</i>	<i>Sheep</i>	<i>Goats</i>
Mountains . . .	18.1	—33.4	—45.2	13.6	—1.2
Hills . . .	12.5	—35.5	—30.4	10.9	—10.9
Lowlands . . .	13.5	—40.5	—43.6	2.1	—43.6
Sardinia . . .	13.2	—36.1	—35.4	9.5	—14.0

Among the agricultural regions of the island the hills in 1930 had the greatest number both of animals *in toto* and of any one species, apart from cattle which were most numerous in the lowlands. The mountains, however, had the greatest number of animals per sq. mile (334), in contrast to Italy as a whole where the hills (266) have the greatest. In the same year the province of Cagliari possessed most animals (1,139,816), followed by Nuoro (914,525), and Sassari (880,317). Cagliari had more animals than any other province of Italy; Nuoro was third, being surpassed by Rome (1,101,800), and Sassari was fourth. Since 1930 all animals, except pigs and mules, have declined in numbers. By 1938 horses had decreased by about 21 per cent., cattle by 13 per cent., sheep by nearly 7 per cent., and goats by 10 per cent.

Horses are important as draught, pack, or saddle animals. The shepherds are all well mounted and greatly esteem their horses. The typical Sardinian horse (*caddu* or *cuaddu*) is a cross between the native breed and the eastern stallion. The original type is still to be found in Barbagia and on the Giara di Genoni. In 1930 the communes with the greatest numbers were: Ittiri (Sassari province), 1,435; Cagliari, 994; and Laconi (Nuoro province), 647. Donkeys are sometimes used instead of horses, but their principal function is to grind cereals and, in the Campidano, to work irrigation wheels. Their popularity is principally due to their cheapness both to buy and to keep. In 1938 the number of horses and donkeys was approximately equal. Mules, though increasing in numbers, are comparatively unimportant, largely on account of the traditional love of the Sardinian for his horse.

Cattle, owing to economic necessity, are reared principally for work, but in contrast to the mainland of Italy (III, p. 57) the ox is preferred to the cow for draught purposes. There is, accordingly, a better

balance struck between the sexes; whereas on the mainland cows and oxen are in the ratio of approximately 3:1, in Sardinia they are more or less evenly divided. The chief breeds of cattle in the island are the native animals and the cross-breeds *Sardo-Modicana* and *Bruno-Sarda*. The native breeds, though small and relatively few in number, are hardy and well adapted to the poorer districts of Sulcis, Marmilla, Trexenta, the Baronie, Barbagia, Gallura, and Nurra, which are now their chief home. The Sardo-Modicana cattle are also well suited to work and, though producing meat of moderate quality, give poor yields of milk. Those reared in the Oristano district are said to be equal, if not superior, to the pure *modicani*, which are native to Sicily. The Sardo-Modicana breed is also reared in the neighbourhood of Narbolia and S. Lussurgiu and in parts of the Planargia and M. Ferru districts. The Bruno-Sarda (native cattle crossed with Brown Alpine) are reared on the more fertile parts of the island, especially near Macomer. These animals are more resistant to disease, especially tuberculosis, than the Alpine cattle. Many live animals are exported to Rome; others are sent to Genoa, Leghorn, Palermo, Trapani, and even to Rhodes and Libya. Dairy cows in 1930 numbered about 85,000 (c. 35% of the total cattle), of which approximately four-fifths were in Sassari province. Milk and cheese production is, however, comparatively unimportant. Neither the Sardo-Modicana nor the Bruno-Sarda are bred exclusively for meat, though the latter are said to make the best store-cattle.

The small native pig, reared principally near Nuoro and in Gallura, is now in itself of little importance, although crossing with imported breeds (Yorkshire, Berkshire, Poland) is fairly intensively practised at Bonorva, Macomer, Bosa, Mussolinia, and near Sassari. Pigs are of the greatest value to the small farmer, who usually has one or two at least.

Sheep have from remote times occupied first place in the economy of Sardinia and remain of the highest importance for the production of milk and cheese, less so for meat and wool. The native sheep are primarily milk producers. There are three principal types of cheese made: *pecorino tipo romano*, which is exported to North America; the traditional *fiore di Sardegna*, which is exported not only to North America but to France, Algeria, and the Italian mainland (Liguria); and *greco*, also exported to North America. In 1925 the cheese industry was first placed on a co-operative basis; legislation to guard against slumps and an experimental laboratory to improve the quality of the cheese followed. The production of mutton occupies second

place. Sardinian lamb is much in demand on the mainland, where it constitutes a large proportion of the 'Romano' production. The wool of the native sheep is coarse and when woven makes a strong, semi-imperious cloth (p. 599). In 1938 Sardinia possessed approximately 20 per cent. of Italian sheep.

Goats are said to number more per head of the population and per square mile of territory than anywhere else in Italy. Herds of goats are most numerous in Gallura, and in the Goceano and Nuoro district, where there are large stretches of uncultivated land. The Sardinian goat, which is above the average in height, has a coat variously coloured, speckled blacks and browns predominating, although grey and white varieties also exist. The horns are somewhat flat and directed backwards (Plate 53). The goat in Sardinia is the poor man's cow; it provides him with milk, one or two kids, meat, a skin for clothing or a carpet, and hair for making saddle-bags (*bertula*). In recent years the number of goats has decreased partly because of legislation designed to prevent unrestricted grazing and partly because the animals are now taxed. In 1938 they still amounted to about 21 per cent. of the total for Italy.

The seasonal migration of animals, more particularly of sheep, from the highlands to the lowlands is an important feature of the pastoral economy of Sardinia, as it is on the mainland (III, p. 65). For example, sheep from the northern Barbagia (around Fonni, Mamoiada, and Orgosolo) at the end of October descend into the Ogliastra; those from the western slopes of the Gennargentu (especially around Tonara and Aritzo) move down into the Campidano. When the snows melt in spring the animals gradually ascend once again to the higher pastures.

Types of Farming

Roughly speaking, the appearance of the landscape and the nature of the products of the land vary from place to place according to the intensiveness of the farming. Only in a small district in the north, particularly round Sassari and also to a certain extent in Gallura, is there any scattered settlement accompanied by dispersed patches of intensive cultivation and enclosed and self-contained holdings. Throughout the rest of the island the type of farming depends largely on altitude and relief. In the plains and lower hill lands cereal growing predominates, in the higher hill lands cereal growing and livestock farming are combined, and in the mountains reliance on flocks is almost complete. Intensive mixed cultivation, like that of Campania

or Tuscany, is confined to a few limited localities. There are, of course, many exceptions to the general rule just stated; some lowland areas, especially in the north, are entirely pastoral, and some mountain areas rely on cereal cultivation. The zoning of agricultural intensity seems to depend not on climate, for practically all the crops of the lowlands will flourish at heights even over 3,000 feet, but on soil and relief.

Lowlands. By far the largest lowland (0-1,000 ft.) area is the Campidano (p. 528), but numerous smaller lowlands, for example the Nurra plain and Sassari district, the Palmas lowland, parts of Ogliastra, and many river mouth plains, have some of the same characteristics, though each has other peculiarities. The Campidano is the most fertile and intensively cultivated part of Sardinia and grows, especially near Oristano and Milis in the north and Cagliari in the south, mixed tree and ground crops, as well as vines. One of the most characteristic districts lies between S. Gavino Monreale and Serramanna near the centre of the plain. Here the communes are of considerable size (45-50 sq. miles) and the villages, which are compact and set well apart, generally contain from 3,000 to 4,000 inhabitants. The soil, which is coarse, gravelly, and more or less highly calcareous, varies in permeability, but is for the most part dry. More than 60 per cent. of the land is in large holdings, one-quarter being latifundia. The majority of the peasants (84.6% in Serramanna) live on smallholdings, which have, in course of time, been so much subdivided as to become in many cases uneconomic. It is not unusual, therefore, for a smallholder to supplement his income by working as a day labourer on a large estate. The land is utilized in roughly the following proportions: horticulture, 8 per cent.; arable alternating with grazing, 47 per cent.; and permanent grazing, 45 per cent. From this it will readily be seen to what a large extent pastoral farming enters into the economy of even the best agricultural land; it is estimated that as much as 18 per cent. of the peasants of this district are purely pastoral.

Around each village, which is near the centre of the typical commune, the farm land is characteristically arranged in three distinct concentric zones. From the village, roads, lined with prickly pear hedges up to about 12 feet high, lead out radially to the first zone of small fields, which are also hedged. The holdings are of an irregular shape and very variably cultivated. Nearest the village there are orchards of olives, citrus trees, almonds, peaches, apricots, and figs. Other trees, such as elms, poplars, wild olives, and carobs, give shade to various ground crops. Vines are cultivated without support, being pruned to a low height. Cereals, almost entirely wheat, become

increasingly important towards the outer edge of the zone. The fruit of the prickly pear is principally used for feeding pigs, and in August and September women and children collect it with the aid of long bamboo poles. Vegetables of great variety are grown on irrigated land near the streams, which almost invariably dry up in summer. The irrigation water, if not obtained directly from the stream, is raised from below ground by means of a winch, worked by a donkey, or less often by an electric motor.

The outer edge of the inner zone is marked by a cessation of the hedges. The second (or middle) zone which follows is characterized by open fields, divided by roads or ditches into large patches. Each field is normally under cultivation for 2 years and then serves as pasture for the following 3-5 years. The principal crops are wheat, which occupies as much as 70 per cent. of the cultivated area, and beans (20%). Modern crop rotations, with fodder growing and manuring (both artificial and green), are rarely practised. Most of the grazing land, known as *paberili*, in contrast to the cereal land which is called *viddaxoni*, is self-sown and is used mainly in winter when sheep descend from the mountains in search of pasturage (p. 580). To convert pasture to wheat land involves considerable labour, owing to the hardness of the ground in early autumn when ploughing is undertaken, as well as to the primitive means frequently used; alongside an iron plough drawn by a horse may be seen a wooden one pulled by a small-sized ox. The seed is not sown until the rains come in October. Until recently the threshing of the harvested grain was by means of a flail, but now steam threshing-machines have come into general use. In late summer the stubble, knee-deep in weeds and thistles, is burnt and columns of rising smoke cloud the landscape.

Beyond the arable fields lies the third or outer zone of permanent grazing land, consisting of a low dry 'heath' (p. 553), which in most areas has long since replaced the *macchia*. The land is used mainly for sheep grazing, except when covered with *cistus* (p. 552). The ground is cultivated here and there, but only to improve the grazing; after a single crop of wheat the land is allowed to lapse into fallow for some 8 or 10 years.

Although the central part of the Campidano described above may be regarded as typical of the richer lowland areas of Sardinia, it should be borne in mind that some of the coastal plains are still marshy, malarial, and scantily populated. Even in the Campidano itself there are districts (e.g. south of Oristano) which have only been reclaimed in recent years or are still unreclaimed. All such areas are at present

of little agricultural importance. The reclaimed areas are normally divided into comparatively small family holdings and are farmed intensively (p. 573).

Hills and Low Plateaux. The most productive areas in this zone (1,000–2,000 ft.) are the basalt plateaux of the north-west, such as those of the Abbasanta and Macomer districts. Although the country in general, like that of the Campidano, is characterized by open fields, the private property as distinct from the communal grazing land is enclosed, usually by dark stone walls of basalt, which may be as much as 5 or 6 feet high. The roads are lined with similar walls, on the top of which thorny brushwood is placed. Despite the generally open and flat nature of the country, the network of walls which separates the irregularly shaped enclosures (called *tanche*) forms a barrier to movement and view. From the rough-surfaced roads narrow footpaths and tracks for pack-animals wind in and out among the *tanche*. An individual *tanca* is entered by a hole in a wall, which is closed by a hurdle. As in the Campidano, the best soils are usually under cultivation with vines, fruit trees, and cereals, though the *tanche* may include arable or grazing land. The zonal arrangement of garden, arable, and grazing lands around the village is less strictly carried out than on the plains. For example, the girdle of arable land is neither continuous nor very broad. Moreover, enclosed *tanche* with tree crops, vine, and irrigated maize penetrate far into the grazing zone wherever the soil is favourable to cultivation. Conversely, arable and grazing lands are often to be found in the immediate neighbourhood of the village. Although, as already pointed out, the country is generally of an open character, there are considerable stretches of *macchia* even within the larger *tanche* and on the common lands beyond the fields. It is estimated that on the Abbasanta plateau 47 per cent. of the productive area is composed of large properties of more than 124 acres (50 ha.). This proportion, though smaller than on the Campidano (60%), would, nevertheless, be a burden on the community were it not for the lower density of population and the fact that farming is of a more 'extensive' character than on the plain. Of the productive area only 3 per cent. is in tree and garden crops, 31 per cent. is arable, and 66 per cent. grazing. The villages are large and compact, and there are scarcely any isolated houses.

The volcanic soils of the north-west are particularly suited to the cultivation of wheat. It is axiomatic among the Sardinian farmers that where *macchia* thrives good crops can be grown. When a site thought to be particularly suitable has been chosen, the *macchia*,

having been cleared in summer, is burnt on the spot. The soil between the roots is then dug by means of a short-handled mattock and then sown with seed, which is covered over by the same implement. Although the wheat may grow well the plants are so widely spaced that a man may walk between them. Only after the first crop has been gathered are the roots of the shrubs extracted to make room for the plough, unless it has already been decided to abandon the field. After a few years at most the plot is allowed to revert to *macchia*. Since these cultivated strips are often far from the village, it is customary to build a temporary hut and threshing floor whence the grain is transported to the village on pack-animals. Old-fashioned ox-wagons are still sometimes used to carry brushwood to the peasant's home to be used as fuel.

Mountain Areas. In the mountainous regions (above 2,000 ft.) of Barbagia, Logudoro, Gallura, and Nùrra the highly 'extensive' pastoral economy of Sardinia assumes its most characteristic form. As much as 90-95 per cent. of the total surface is classified as, grazing and woodland, but mostly grazing, since forests, including chestnut groves, occupy only 2-7 per cent. Arable cultivation in rotation with grazing amounts to only 8 per cent. of the surface in Barbagia, 7 per cent. in Logudoro, and 0.8 per cent. in Gallura. The area devoted to horticulture and tree crops nowhere exceeds 1 per cent.

In Barbagia (p. 524), which may be regarded as typical, little of the surface is below 1,300 feet, so that the agricultural settlements are at high altitudes, in many cases at 2,500 or more feet. They are, however, as a rule so situated that the farming community can utilize both the mild and relatively fertile valleys of the region and the poorer and more exposed pastures of the higher ground. The climatic factor is, however, of less importance in the utilization of the land than the limits imposed by the relief and soil. Even near the highest villages some sort of cereal cultivation appears to be climatically possible, but in practice patches of arable land are usually to be found at a distance from the settlements, for example in a protected valley. The same is true of the vine, which can be cultivated up to nearly 3,000 feet, and also of various nut-trees, whose upper limit is about 3,275 feet. Winter-grazing, on the other hand, ceases at 1,975-2,250 feet; not until the end of April are altitudes above these limits open to animals (p. 581).

The majority (c. four-fifths) of the peasants in Barbagia occupy very much subdivided smallholdings of less than 25 acres, whereas

the wealthier landowners (c. one-twentieth of the total population) owning medium and large holdings of more than 124 acres control more than half the total surface. This uneven division of the land is to some extent offset by the large amount of common land available; smallholders in particular make use of it to supplement the pasture of their own farms. It is also usual for a large landowner to provide a shepherd with grazing land. The shepherd in return undertakes to supervise not only his own animals but those of the landlord, who may supply as much as two-thirds or three-quarters of the total herd. During the contract period, which is normally for 5-7 years, taxes and expenditure are borne equally by landlord and shepherd, and the milk, cheese, wool, and meat are also shared in equal proportions. At the end of the contract period the animals, together with any increase, are evenly divided, so that a capable shepherd, though landless, may eventually own a flock of considerable size. If a large landowner employs a day labourer to look after his animals, the latter is provided with food, clothing, and a few animals. Some of the larger communes are said to contain as many as 40,000-60,000 sheep, 1,000-2,000 cattle, and several thousand goats and pigs. For example, Desulo, on the southern slopes of M. Gennargentu at 2,950 feet, is one of the wealthiest villages in Sardinia and produces much cheese and wool. In 1920-1921 the village possessed 30,000 sheep, 8,000 goats, 4,000 pigs, 1,000 cattle, and 700 horses. Sometimes a mountain commune may own as much as half the land, mostly the grazing areas.

Since fallow as a rule forms the best grazing land, even stony ground may be cultivated with cereals to improve the pastures. The owner employs a day labourer or perhaps a smallholder. The plough is seldom used; instead the ground is 'scratched' with a mattock or, alternatively, with a kind of primitive spade (*seminare a rokku*). The seed is supplied by the landowner, to whom an equal quantity (in some cases double) is returned after the harvest. The working peasant keeps the rest of the crop, which, since it is produced from virgin soil, is larger than might be expected from such poor land. It frequently happens that, as among the hilly parts of the island, the *macchia* must first be cleared before the ground can be broken for cereals. This, in spite of government prohibitions, is normally accomplished by burning. Although wheat is the principal cereal grown, barley often takes its place in the highest zones, especially in granite areas. After one or two years the land is allowed to lapse into grazing.

Life in the settlements has changed little since ancient times. Homespun is still woven on simple looms, while wheat is ground by primitive millstones turned by blindfolded donkeys. Occasionally water-mills are used, but since the corn is ground with the husk the women are still compelled to separate the bran. Bread as we understand it is not eaten; instead the peasant-women bake large, round, flat cakes, about half an inch thick and 14-18 inches in diameter. In Barbagia such a cake is called *pillonca*, but other names are used elsewhere, such as *carta di musica* in the north of the island. Pillonca, which contains little yeast, lacks flavour and quickly becomes hard. At a distance from the village temporary shepherds' huts, built of wood, are sometimes to be met with, usually in groups of four or five within a thorn enclosure. In addition, groups of large circular stone huts may occasionally be seen. Surrounding each hut are several little courtyards, designed mainly for the flocks. The whole establishment, which is known as an *istapu*, is bounded by a wall. The *istapu* is important partly because it is used as a cheese dairy. In the spring large round cheeses mount up daily in the hut, whence they are transported on horseback to the village, where they remain throughout the summer. In the autumn they are transported by ox-cart to the railway station. Shepherds in Sardinia may still be seen dressed in their traditional costume of a sleeveless lambskin jacket, or *mastruca*, white linen stockings, black woollen gaiters, coarse home-made shoes, and a kind of long cap, or *beretta*.

LAND RECLAMATION AND AFFORESTATION

The conditions determining the programmes of this kind of public works are rather different from those on the mainland, principally because of the smaller density of population. There is no urgent need of new agricultural land to relieve the pressure of population on the mountains and hills; rather there is wanted an all-round intensification of farming to permit a reduction in the flocks of sheep and goats, which are mainly responsible for the deforestation and denudation of the landscape. Since the Sardinians are so firmly wedded to their pastoral way of life with 'extensive' crop growing only, it has, however, been found difficult to persuade the islanders to adopt with success the intensive methods appropriate to reclaimed marshland, and most of the colonization of reclaimed areas has been done by immigrants from the mainland (Venezia Euganea, Emilia, Lombardy). Owing to the relatively great damage done by the severe summer

drought and the prevalence of strong winds, the provision of irrigation water and the planting of trees as windbreaks are matters of great importance.

The area of land affected by land reclamation schemes and by mountain improvement schemes in Sardinia is 2,296,000 acres. The different nature of the work and the smaller population density make erosion control relatively less important than in the Peninsula. In some of the smaller areas the drainage and other public works have been completed: e.g. S. Lucia di Bonorva (5,000 acres), the Padulo di Tempio Pausania (1,250 acres), and a number of areas in the Campidano. Of the total area classified, there is about 1,524,000 acres on which work has still to begin.

The areas concerned are mostly small river-mouth plains all round the coast, the Nurra (plain and hills), the greater part of the Campidano, the middle Coghinas basin (above the reservoir), and the Sulcis lowlands and hills (III, Figs. 3, 4). For example, at Sanluri in the Campidano the Opera nazionale Combattenti manages an area of 5,700 acres consisting of a reclaimed salt marsh. At first large estates with labourers and share tenants were set up, but more recently the area was divided up into 125-acre family holdings, of which there were to be 60 by 1939.

Mussolinia and Terralba represent the only really ambitious programme at all advanced. The scheme was started in 1924 and included the alteration and embanking of the R. Mogoro and R. Santa Anna, the drainage by pumping of marshes and of the Stagno di Sasso and the infilling of other similar areas, the construction of an irrigation system using water from the Tirso reservoir and an irrigation reservoir on the R. Mogoro. So far 8,080 acres of marsh or lagoon have been drained, 294 miles of canal and 75 miles of road have been constructed, trees have been planted along the sand-dunes to act as windbreaks, and 246 families, mostly immigrants from northern Italy, settled in farms. A type of farming (cereals, milk, wine, meat) similar to that of the Northern Plain is practised.

The southern part of the Nurra area has been colonized by a Ferrarese society, which at the same time is carrying out the land improvements. Work started in 1934. Fertilia is the centre of the colony, where about 100 holdings of 50 acres were ready in 1938. The other most important centre of activity is the small coastal plains to the west and south of Sulcis.

Afforestation, which is the other half of the whole policy of bonifica integrale, seems less closely related to land reclamation than in Italy.

Reafforestation in Sardinia, which only lost its forest cover during the middle and later nineteenth century, has always been made difficult by the strong winds and severe summer drought. High mortality among young trees brought to naught all the efforts before 1919, when a method of seeding rather than planting was found to be more successful. Up to 1915 the area effectively reafforested was only 1,250 acres, but from 1920 to 1929 another 4,450 (3,780 in the mountains, 670 coastal), and from 1930 to 1934 a further 2,970 acres were dealt with.

The area of forest in 1938 was 754 square miles, 8.1 per cent. of the island, composed mostly of holm-oak coppice with some high forest of holm oak and deciduous oak. About 150 years previously the proportion had been about 20 per cent. This rapid destruction was mainly due to unrestricted cutting and charcoal burning for the smelters; grazing by sheep and goats and fires started by shepherds prevented regeneration. Drought is the main difficulty in the way of reafforestation. In the mountain valleys stone pine, cork, holm, or deciduous oaks, and acacia are grown. On granite soils eucalyptus is planted below 650 to 1,000 feet, and above this cypress and *Cedrus atlantica*. Chestnut and Corsican pine are confined to the higher and damper zones. Along the coastal sands stone, maritime, and Aleppo pine are grown. In the lowlands, especially the reclaimed areas, eucalyptus is grown in windbreaks, its very rapid growth being invaluable.

The most important areas of reafforestation are (i) in the mountains, the upper basins of the R. di Pula, Sassu (near Soleminis), Leui (south-west of Villacidro), Tirso (Goceano and M. Lerno), Cedrino (M. di Orgosolo), Coghinas (Goceano), and Liscia (Mi. Limbara); (ii) along the coast, at S. Margherita di Pula, Poetto (Cagliari), Porto Pino, S. Pietro island, Mussolinia, Siniscola, Orosei, Cugutto (Fertilia), Porto Conte (near Alghero), near Sorso, and on Caprera island; and (iii) among reclaimed areas, at Palmas Suergiu, Elmas (Cagliari lagoon), Decimoputzu, and Fertilia.

FISHERIES

In general it is true to say that in spite of the long and indented coastline the Sardinians have not taken to maritime activities, and much of the fishing even to-day is done by immigrants from the mainland, for example, Genoese and Livornese.

Among the sea fisheries the sardine fishery has much declined in

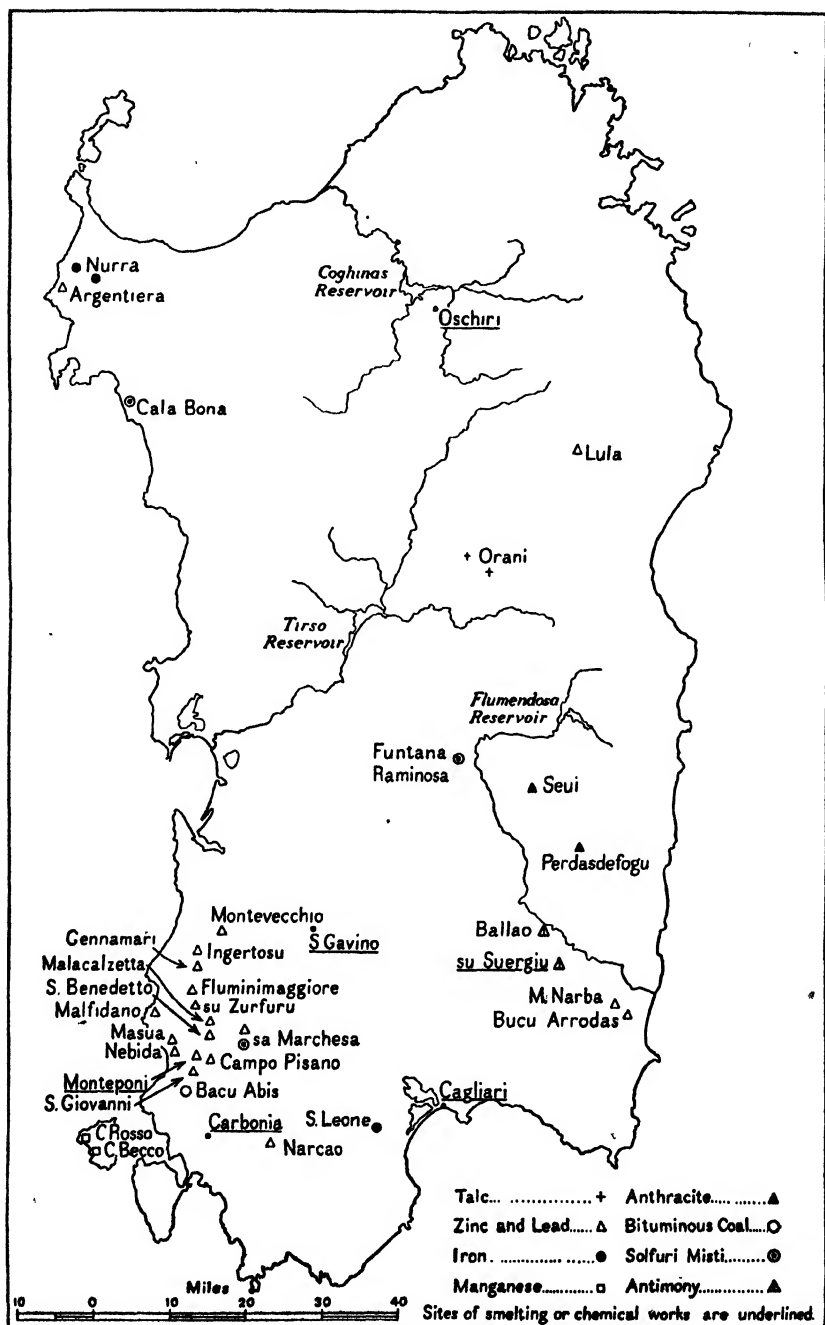


FIG. 48. *The principal minerals of Sardinia*

importance, but is pursued from May to August in the southern parts of the gulfs of Cagliari, Teulada, and Palmas, and especially from Porto Torres. Lobster fishing, mainly by Neapolitans, is comparatively important in the north, on La Maddalena and Asinara islands, and near Alghero, Tortoli, and Porto Coralle. Lobsters are exported to Naples, Leghorn, Genoa, and Marseilles. Otherwise the tunny is the chief catch. The location of the *tonnare* and the methods are described in Volume III (p. 147). The extreme length of the season is from 1 May to the end of June, the average length from 4 May to 20 June. The principal traps (mostly in Genoese hands and with curing establishments near by) are Salmi (near Stintino), Columbargia (near Bosa), Flumentorgiu (south of the gulf of Oristano), Porto Paglia (near Gonnese), Portoscuso, Isola Piana, and Cala Vinagra (north-west of S. Pietro). Sardinia was famous in Roman times for tunny preserved in salt, but oil is the principal modern preservative.

The lagoon fisheries are the most important of all in point of quantity of food for home consumption and export. As on the mainland great importance attaches to the seasonal and tidal changes in the proportions of salt and fresh water. The lagoons are rich in fish of many kinds, which are caught mainly during their periodic migration to the sea, determined by tides, seasons, and winds. Traps and nets are set in the sea openings, and the catch includes great numbers of mullet, eels, soles, gilthead, gudgeon, pike, shrimps, crabs, and mussels. The principal lagoons for fish are Cagliari (S. Gilla), Colostrai (near Muravera), Tortoli, Pilo (Porto Torres), Calich (Alghero), Pontis, Mistras, S. Giusta, and Marceddi (all near Oristano), and Iglesias (near S. Antioco).

INDUSTRIES

SARDINIA has little industry, mining, metallurgy, and the extraction of salt from sea-water being the most important developments. Apart from small chemical manufactures, the remaining industrial activities are mostly dependent on agriculture, and are little more than 'cottage' industries.

Mining, Metallurgical, and Chemical Industries (Fig. 48)

The mining industry is of great antiquity, as the earliest known workings date from the Bronze Age. Mining was later carried on by the Phoenicians, and also by the Romans, some of whose excavations

are of considerable depth. Mining was continued by the Pisans during the Middle Ages, but suffered a set-back after the discovery of rich silver deposits in America lessened the value of Sardinian silver. In subsequent centuries the demand for lead caused a revival of the island's mining industry, and in recent years it has flourished, partly owing to Fascist attempts at self-sufficiency.

At the present time the most important ores worked are those of lead and zinc, which yield some silver and cadmium as by-products; ores of lesser importance are also mined, including those of antimony, copper, iron, manganese, molybdenum, nickel and cobalt, and tin. Mercury and tungsten also occur, but are not worked in paying quantity. The most important non-metallic mineral is coal, but barytes, kaolin, and talc are also worked commercially. A great variety of building materials occurs in all parts of the island, and the extraction of sea-salt by evaporation is a relatively important industry.

The island's output of minerals and metals contributes considerably to Italy's total production, amounting to 90 per cent. of the total lead ore, 70 per cent. of the zinc ore, and a large part of the hard coal output. The lead-smelting capacity is about 80 per cent. of the Italian total.

Lead, Zinc, Cadmium, and Silver. Zinc and lead ores are chiefly mined in the Iglesias district, though they also occur in many other areas. They are found mainly as lodes and impregnations in Cambrian limestone and dolomite, mineralization being associated with the Carbo-Permian granite which forms a large part of eastern Sardinia. Mineralization occurred again much later, at the time of the formation of the Alps, when the lodes in the western part of the Nurra are believed to have been formed. Both types of veins are found in the main mining district round Iglesias, where the earlier mineralization produced irregular ore masses and impregnations containing both galena and zinc blende. The later (Alpine) lodes tend to run in more uniform directions (east to west and north to south) and contain galena often rich in silver, but are sometimes deficient in zinc blende. The chief veinstones are quartz, calcite, and barytes, the last occurring in paying quantities in some of the mines. Galena is sometimes accompanied by the decomposition products cerussite (lead carbonate) and anglesite (lead sulphate) and also by pyromorphite (a phosphate and chloride of lead). The zinc blende is also found with other zinc minerals, including smithsonite (carbonate), calamine (hydrosilicate), and hydrozincite (hydrous carbonate). Calamine is the most important of these subsidiary minerals. The

cadmium content of some of the ores is unusually high, some containing 1.66 per cent. metal content.

Some twenty-five principal mines have been in production in the Iglesias district in recent years, and many smaller mines are worked from time to time. The chief mining companies include the Società Italiana del Piombo e dello Zinco, which belongs to the Montecatini combine, the Pertusola company, and the S.A. di Monteponi. The names of the more important mines are Malfidano, Acquaresi, Masua, Nebida, Monte Agruxau, Monteponi, Malacalzetta, S. Giovanni, Seddas Moddizzis, Monte Onixeddu, Rosas, Begatrotta, Montevecchio, Gennamare, Ingurtosu, Fluminimaggiore, S. Benedetto, Domusnovas, and Narcao. The Campo Pisano mine at Iglesias is famous for its production of calamine, and in the Rosas, su Zurfuru, and sa Marchesa mines galena and blende are found with pyrites and chalcopyrite (*solfuri misti*). The northern part of the mining belt is connected by road and narrow-gauge railway with the metallurgical works at S. Gavino Monreale, and the southern part with the Sulcis coalfield and the harbours of Porto Vesme and S. Antioco.

Galena and blende also occur in south-eastern Sardinia, and a few mines including the M. Narba and Bucu Arrodas are worked south-west of Muravera. Similar ores also occur in the Ogliastra district and farther north near Lula, but mining in these districts is on a small scale. Fluorspar is sometimes included as a veinstone, and both silver and antimony are associated with the lead-zinc ores. In the granite area of Gallura ore-bearing veins are scarcer than in the southern and eastern areas, and contain a little molybdenite and copper ore in place of galena and blende. The Gallura ores are not mined, but the lead-zinc ores occur again in the hills west of the Nurra, and are worked at the Argentiera mine on the west coast.

The Iglesias ores are mainly treated at the Monteponi works, and although both gravity concentration and flotation methods are used for separating the zinc ore from the gangue and lead ore, the flotation method is found more efficient. Some ore is exported from Sardinia without being treated. The lead concentrates from the Montevecchio (Plate 57) mines are sent to S. Gavino for smelting, and those from the Monteponi group are smelted at the Monteponi mine. The lead concentrates from the mines belonging to the Pertusola company are sent to the Lerici works at Spezia. The annual capacity of the two Sardinian smelters is 38,000 tons of refined lead, but production is usually less, e.g. 22,000 tons in 1941. Zinc is smelted at the Monteponi plant, but zinc concentrates are also sent to be smelted at Vado Ligure,

Porto Marghera, and Crotone. The total production of zinc concentrates is 78,000 tons a year. The cadmium is recovered from the zinc ore at the Monteponi works by treatment with sulphuric acid, the zinc being deposited by electrolysis of its sulphate. Oxide of manganese is used to remove limonite, which occurs as an impurity. Small quantities of antimony and arsenic are recovered. Any silver present is recovered during the lead-smelting part of the process. The Monteponi works have an estimated capacity of zinc metal of 7,000 tons a year; production in 1934 was about 5,000 tons. In addition these works produce about 5,000 tons of lead a year, less than 100 tons of cadmium (metal), and about 8,800 lb. of silver.

Antimony. In addition to the small quantities of antimony recovered at the Monteponi works, relatively larger quantities are found as stibnite in Devonian limestone in association with diorite at Villasalto. Reserves of antimony are likely to be small. Two mines are working at su Suergiu and Ballao, and the ore is smelted at su Suergiu. The mean annual output is about 500 tons (metal content) a year, though this has been raised to about 1,000 tons since 1938. Production is mostly in the form of antimony metal, but oxide is also produced.

Copper. The chalcopyrite, which occurs with the other sulphides in the sa Duchesa mine in the Iglesiasiente, occurs in sufficient quantity to be worked, but this is the only mine in that area where this is done. Chalcopyrite is, however, also mined at Funtana Raminosa west of Seulo, where it occurs associated with diorite in Silurian rocks. This mine has a concentration plant, and there is smelting equipment at Cagliari with a capacity of 600 tons a year. A third mine, the Cala Bona, is worked at Alghero, where chalcopyrite occurs in Triassic limestone. Sardinian production of chalcopyrite was 2,000 tons in 1933. Further discoveries of copper in both the Funtana Raminosa and Alghero districts are considered possible.

Iron. Pyrites occurs with the other ores in some of the Iglesiasiente mines, especially at Domusnovas, but not in important quantities. Iron ore also occurs near Teulada, and in the Ogliastro district haematite of Permian age has been worked at Villagrande near Lanusei. Magnetite is worked at the S. Leone mine south-west of Cagliari, and as it occurs as a segregation in granite there is a possibility of finding larger ore bodies here. Most of the iron output of Sardinia is from the Nurra, where siderite and limonite deposits have formed in the more ancient rocks. The two chief mines are owned by the Ilva company, and are 12 miles south-west of Porto Torres, with

which they are connected by a mineral line. Owing to high phosphorus content (up to 0.8%) the siderite (metal content 41%) has to be treated by a special process, and it is sent to Bagnoli and to Cornigliano Ligure for smelting. The normal annual output of ore is about 100,000 tons, and reserves have been estimated at 5,000,000 tons.

Magnesium. A small plant for extracting magnesium from dolomite was installed at S. Giovanni Suergiu in 1935, but was closed down soon after 1938.

Manganese. Ore occurs in trachyte on S. Pietro island, and is mined near Cape Rosso and Cape Becco. Output was only 234 tons of ore in 1933, but new equipment has been installed in recent years and output has probably been increased. No estimate of reserves is known, but as the trachyte also occurs on S. Antioco island, in the hills round Iglesias, and over a wide area in the north-west, manganese ore may occur in these districts.

Mercury. Mercury has been found associated with galena and blende in some of the Iglesias mines, but is not worked commercially.

Molybdenum. Molybdenite occurs in quartz veins traversing granite and Silurian rocks at Sarroch south-south-west of Cagliari, Gonnosfanadiga, and Arbus south-west of Guspini. If it has been mined in recent years, output has been small. No wolfram has been reported from these veins.

Nickel and Cobalt. Nickel ore (niccolite) and cobalt ore occur in quartz near granite in the Iglesias area. Two disused mines have been reopened recently owing to the discovery of new veins, and cobalt ore is mined near Palmas Suergiu. The output of both these minerals is, however, small, and they are difficult to extract because they are intimately mixed with galena, blende, and many other minerals. Production of Sardinian niccolite was only 130 tons in 1938.

Tin. Tin is mined at Villacidro south-west of S. Gavino Monreale, but output is small. Cassiterite seems to be a rare mineral in the Iglesias lodes.

Barytes. Barytes is sufficiently common as a veinstone in the Iglesias mining area to be worth extracting, and is produced at the Fluminimaggiore, Serbariu, Narcao, Santadi, and su Benatzu mines. The mineral is treated in the mining area; production was about 3,000 tons in 1933 and has probably risen since that date. Barytes also occurs as a veinstone at Tertenia south of Lanusei, but is not known to be worked on a large scale.

Coal. There are two separate coalfields in the island: the 'Sulcis'

coalfield south of Iglesias and the Seui coalfield south-west of Tortoli. The Sulcis coalfield covers about 16 to 20 sq. miles, and the seams are in Eocene rocks (I, p. 26) which occupy a basin bounded mainly by older rocks. Some seven collieries are working between Gonessa and the new coal town of Carbonia, the best known being the Bacu Abis and Terras Collu. They are owned by the Azienda Carboni Italiani and operated by the Carbo-Sarda Company. The coalfield is connected by rail with Iglesias and the port of S. Antioco. The coal has a calorific value of about 5,000 to 7,700 per kilogram and the ash content (dry) is 10 to 20 per cent. It is used to some extent for coaling ships, in electric power stations at S. Catarina near by and at Cagliari, and on the Sardinian railways; it is also exported for use in the Bagnoli blast furnaces and the Sicilian sulphur industry, but it is not of good enough quality to be of great value, as its sulphur content is sometimes as high as 10 per cent. A washing plant with a capacity of 8,000 tons a day was installed at Carbonia in 1939, and a low-temperature distillation plant has been built near by with an annual capacity of 70,000 tons of semi-coke and 10,000 tons of tar which could undergo hydrogenation. The actual production of coal in 1935 was about 50,000 tons, though the output may have increased to nearly 2,000,000 tons a year by 1942. The lowest estimate of reserves is 50,000,000 tons, but may be higher if the Eocene rocks are proved to extend westward under the Oligocene trachyte. An even greater possible extension under the Miocene rocks to the east and north is possible, and deep exploratory borings have been sunk.

The Seui coalfield is smaller than the Sulcis, but produces better quality coal (anthracite). The seams are of Upper Carboniferous or Lower Permian age, and occur in a series of small disconnected basins which trend north-west to south-east from near Seui to Perdasdefogu. Potential output is estimated at 50,000 tons a year. This anthracite, which has a minimum calorific value of 6,650 per kg. but a rather high ash content (15 to 18%), is used for smelting lead. Reserves must be relatively small as the outcrops are bounded on all sides by ancient unproductive rocks.

Beds of lignite or brown coal are known to exist also at Ierzu and Ulassai, west of Lanusei; at Gairo south-west of Lanusei; and at Laconi west of the Sarcidano plateau, but none of these have been proved so far to be of economic importance.

Kaolin. One of the most important deposits of kaolin belonging to Italy is that near Serrenti, about 14 miles north-west of Cagliari. It is formed by the weathering of Oligocene trachyte, and has been worked



PLATE 55. *Quarry near Sassari*



PLATE 56. *A Sardinian tunny trap*

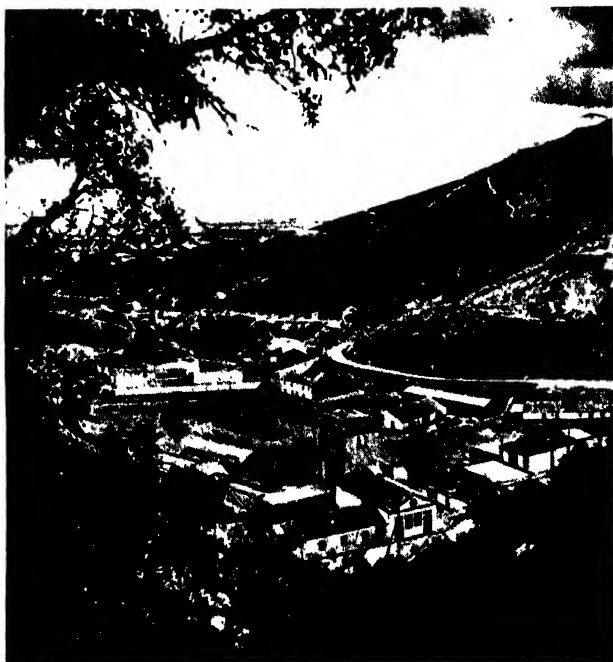


PLATE 57. *Montevecchio zinc and lead mine*

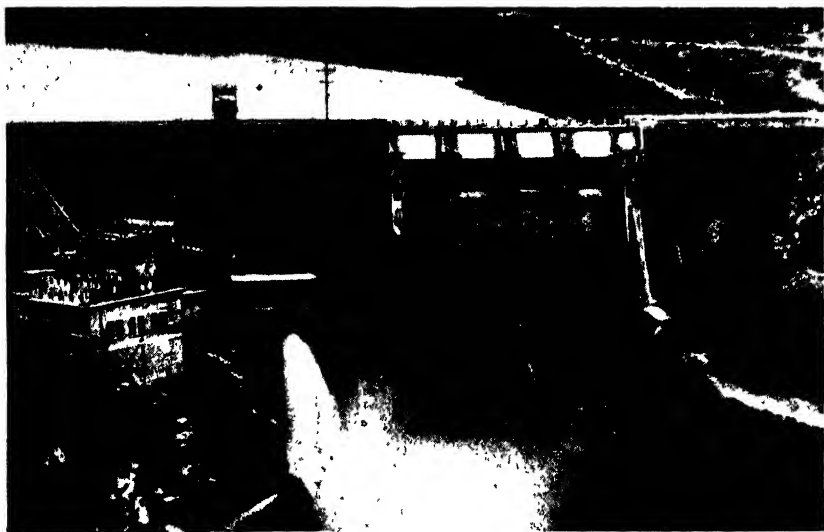


PLATE 58. *The Oshiri dam on the F. Coghinas*

for more than 60 years. Production in 1933 was 8,550 tons, and reserves were estimated in 1935 at 3,000,000 tons. Refractory material is prepared from kaolin at Cagliari, production being 2,600 tons in 1930.

Talc. Talc and steatite are mined round Orani, south-west of Nuoro, and owe their existence here to the proximity of the granite. Annual production amounts to about 4,000 tons, equivalent to about 15 per cent. of the total Italian output.

Building Materials. Many of the rocks of Sardinia are used locally for building and were employed by the builders of the nuraghi. For instance, the famous Nuraghe Nieddu near Ploaghe station is built of the local lava. Many suitable sandstones have also been known for centuries, and the Romano-Punic buildings of Nora, Bithia, and Tharros were made of raised beach sandstone. The same material was used for part of Alghero cathedral and for other old buildings in that town. Miocene sandstone is quarried at the present day at several places along the outcrop from Cagliari to the Nurra. Marble, mostly white in colour, is found in the lower Flumendosa valley, on the north side of Alghero bay, and near Teulada. Granite is the most valuable quarried stone, and is not only used extensively for local buildings, but is also exported, e.g. from La Maddalena. The chief areas where it is worked are near La Maddalena, Nuoro, Tortoli, and Cape Carbonera. Production has been estimated at about 13,000 cubic yards a year. Porphyry occurs near Tortoli, and volcanic tuff near the Coghinas reservoir.

At Cagliari there are two cement works owned by the S.A. Italcementi with an output of about 70,000 tons (in 1936). The limestone used as raw material is mostly obtained from the neighbouring Miocene deposits. Sun-dried bricks are still made extensively from local clay in the Campidano, and the same clay is used for making bricks and ceramics near Oristano and for refractory materials. Sand is dug especially near Cagliari, presumably for use in building, and near Isili for foundry work.

Chemicals. Salt is obtained by the evaporation of sea-water chiefly at two separate areas east and west of Cagliari and also at Carloforte. The works at Carloforte and part of those at Cagliari are run by the State, while the remainder at Cagliari are privately owned. Convict labour is used to some extent at Cagliari. The production is about 500,000 tons a year, and in 1938 total exports of salt were 350,000 tons, of which 250,000 went to Italy. Magnesium chloride and magnesium sulphate are produced as well as sodium chloride, and

a plant has been installed at Cagliari for extracting bromine with an output of 30 tons a year (about 23% of total Italian production). Potassium salts are also manufactured for use in the fertilizer industry.

Synthetic ammonia is made by the Sarda-Ammonia company near the Coghinas electric power station, and nitric acid is produced at Oschiri. Ammonia solution (25%) is pumped by a 10-miles long pipe-line from the Coghinas station to Oschiri. Sulphuric acid and ammonium sulphate are also made at Oschiri. The Montecatini combine manufactures sulphuric acid and superphosphates near Cagliari, using pyrites and phosphates as raw materials, and sulphuric acid is also produced at Monteponi. The total capacity for sulphuric acid is 18,000 tons a year. Hydrogen and oxygen are separated at Cagliari, the oxygen being obtained both by the liquid air process and by electrolysis. Methyl alcohol is produced near the Coghinas power station (capacity 1 ton a day), and alcohol is also distilled at Pirri and Quartu S. Elena near Cagliari. The chief towns on the island have their own gasworks.

Lesser Industries

Many of the island's industries, especially those connected with weaving cloth and carpets, are still largely carried on by craftsmen and in the home, and traditional methods have survived longer than on the mainland of Italy. Some of the industries are centred near their raw materials, an outstanding example being the treatment of cork. The trees are grown chiefly in the Gallura and the upper Tirso basin, and the principal centre for treating the bark is Tempio Pausania. Other nearby centres include Aggius, Luras, and Calangianus, as well as Terranova to the east and Budduso to the south. A separate area of production is at Abbasanta and Ghilarza, west of the Tirso reservoir. About 5,000 tons of cork are produced in an average year and much is exported unmanufactured.

Other small-scale industries are more scattered. There are tanneries at Cagliari, Sassari, Bosa, and Iglesias, and special leather-work is done by traditional methods at Dorgali. A state tobacco factory at Cagliari is largely supplied by tobacco grown in the Nurra. Soap and candles are manufactured at Cagliari and Sassari, wood-carving is an occupation at Aritzo and other places around M. Gennargentu, and metal-work at Isili (copper), Gavoi, and Cagliari (beaten iron), but this last industry has declined in recent years. The ancient traditional craft of ceramics still flourishes at Oristano, Dorgali, Assemini, Tortoli, Nurallao, Pabillonis, and Teulada.

The dwarf palm (*Chamaerops humilis*) yields a fibre which is used for making baskets, string, and even rope. The main centres of these industries are at Sorco, Castel Sardo, Alghero, and Sennori, 7 miles from Sassari; string is also made from other plants at Tinnura and Sinnai. There are small paper mills at Domusnovas and at Quartu S. Elena near Cagliari. Macomer is a centre for cleaning and preparing wool, and coloured and embroidered woollen materials are finished at several places, including Bosa, Oristano, Tresnuraghes, and Teulada, whilst the well-known cloth known as *orbace* is woven at Osilo. Woollen rugs and carpets with 'peasant' designs are made especially at Aggius and Isili.

The food-preparing industries are also mostly on a small scale. One speciality is ewe's milk cheese, which is prepared at a number of local centres including Macomer, Mussolinia, Ozieri, and Cuglieri west of Macomer. Olive-oil is extracted by modern methods near Sassari, Alghero, Bosa, Cuglieri, Oristano, Iglesias, and a number of smaller centres. The industry, which is relatively much less important than on the mainland, is largely situated in the western districts. Nearly 2 million gallons of oil are produced in an average year. Flour mills are worked mainly at Cagliari, Sassari, and Oristano. Various kinds of food are prepared at Cagliari, Sassari, Oristano, Muravera, Pirri, Monserrato, Villacidro, Quartu S. Elena, Tempio Pausania, and Ozieri, and in particular preserves are manufactured at Alghero and chocolate at Cagliari.

A number of districts make individual types of wine. The best quality include 'vernaccia', a white wine from the district north of Oristano; a red wine from the Campidano; and among others good wines from Oliena, Lanusei, Ierzu, Iglesias, S. Antioco, and Mussolinia. Liqueurs are made at Sassari, Ozieri, Tempio Pausania, Villacidro, and Cagliari, and beer is also brewed at Cagliari.

WATER AND ELECTRICITY SUPPLY

Water-supply

Sardinia's water-supply is in general deficient, primarily owing to the long summer drought. About two-fifths of the rain-water which falls on the island goes to the sea as direct run-off, the remaining three-fifths either sinks underground, some being recovered as springs, or is lost by evaporation.

The run-off is particularly rapid owing to the relatively large area of

impermeable rocks, which amount to about 60 per cent. of the total surface, and is accelerated by deforestation and unsuitable methods of cultivation on the hill-sides and the burning of large areas to improve pasture. Thus much water runs to waste which should be naturally preserved for use in the dry season. The most impermeable rock is granite, which occurs over much of the eastern half of the island and in patches south-west of the Campidano. In some places, however, disintegrated granite holds water-supplies in areas which would otherwise be deficient. The Cambrian, Ordovician, and Silurian rocks of the Iglesiente are unreliable as sources of water. The small patches of basalt near the east coast are usually devoid of water.

The belt of Miocene rocks from Sassari to Cagliari and some of the volcanic rocks north of Oristano are semi-permeable. The Eocene sandstones of the Sulcis coalfield hold some water, but are variable. The Triassic limestones of the Nurra are only semi-permeable, but the Jurassic and Cretaceous limestones of central and eastern Sardinia hold large stores of water. The volcanic rocks of S. Pietro and S. Antioco islands and of the M. Ferru region and the alluvial deposits of the Campidano also hold some water.

Surface-water is difficult to obtain in most low-lying districts from about May to October (I, p. 51), but there is a slightly better, though still unsatisfactory, summer supply in the mountains, especially round M. Gennargentu. Unfortunately the winter snow does not lie long enough to give good summer storage. Owing to the rapid run-off, the use of surface-water is mostly limited to the rainy season, and irrigation is hampered by uncontrolled flooding at the seaward ends of the valleys caused by the bars which obstruct many of the river mouths. The whole population, therefore, depends very largely on supplies from springs, wells, or reservoirs, especially in the dry season.

Some water is raised by primitive means, including the use of donkeys, from shallow wells, especially in the Campidano. Spring-water, either distributed by aqueduct or stored in reservoirs, is the most important source of supply. A survey of some 26,000 springs shows that a great majority have a yield of less than 13·2 gallons per minute, and only 530 have a greater flow than this. The springs from the Jurassic and Cretaceous limestone formations and some of those from the permeable volcanic rocks maintain their supply in summer, but the yield from other springs tends to fall after drought. Some of the rivers which are fed by springs from limestone have constant water in their upper courses, though their lower beds run dry.

The limestone of the Sarcidano plateau yields strong springs,

especially near Laconi (132 gallons a minute), and an aqueduct has been proposed to supply 70,000 people from these springs. Exceptionally abundant springs near Domusnovas with a minimum yield of about 2,000 gallons a minute contribute by 30 miles of pipe-line to the Cagliari supply system and help with the irrigation of part of the Campidano. The Cagliari system is also supplemented by a rather unreliable supply from the two small Corongiu reservoirs 11 miles north-east of the city. Cagliari water is not considered safe as drinking-water.

The supplying of other towns in the island has presented considerable difficulties. This problem at the naval base at La Maddalena has been solved to some extent by the construction of a small reservoir (about 1,400 ft. long), and the daily water allowance is reported to be 17½ gallons a head. The granite country of the Gallura is poorer in natural springs than any other part of Sardinia, so that any large supply scheme is difficult, and rain-water collected from roofs has to be carefully conserved. Nuoro has a fairly adequate supply from a limestone source, and Sassari is supplied by pipe-line with 660 gallons a minute. Oristano, Bosa, and the agricultural settlement of Mussolinia have some supply of water laid on, but there is probably room for improvement.

The only large schemes in operation for storing water are on the Tirso and Coghinas rivers. The Tirso reservoir, also called Lake Omodeo after the engineer who designed the dam, is said to be the largest artificial lake in Europe, being 15½ miles long and 1½ miles wide. The volume of water is estimated at 82,000,000,000 gallons, and it is used partly for electric power (p. 604) and partly for irrigating about 150 square miles of the plain near Oristano. The Coghinas reservoir in northern Sardinia is estimated to contain about 53,000,000,000 gallons and is used mainly for electric power (p. 604), as there is not much irrigable land in the Coghinas valley. Two smaller reservoirs have also been constructed: one about 3 miles long near the source of the F. Flumendosa north-west of Lanusei was designed as a source of electric power, and another on the F. Mogoro (near the southern end of the gulf of Oristano) with an estimated capacity of 794,000,000 gallons was designed mainly as a source of irrigation. Plans have been made for the construction of some forty smaller reservoirs in various parts of the island.

Mineral Springs. Mineral springs are numerous, and their medicinal properties have been appreciated since early times. A number of wells have been venerated ever since the building of the

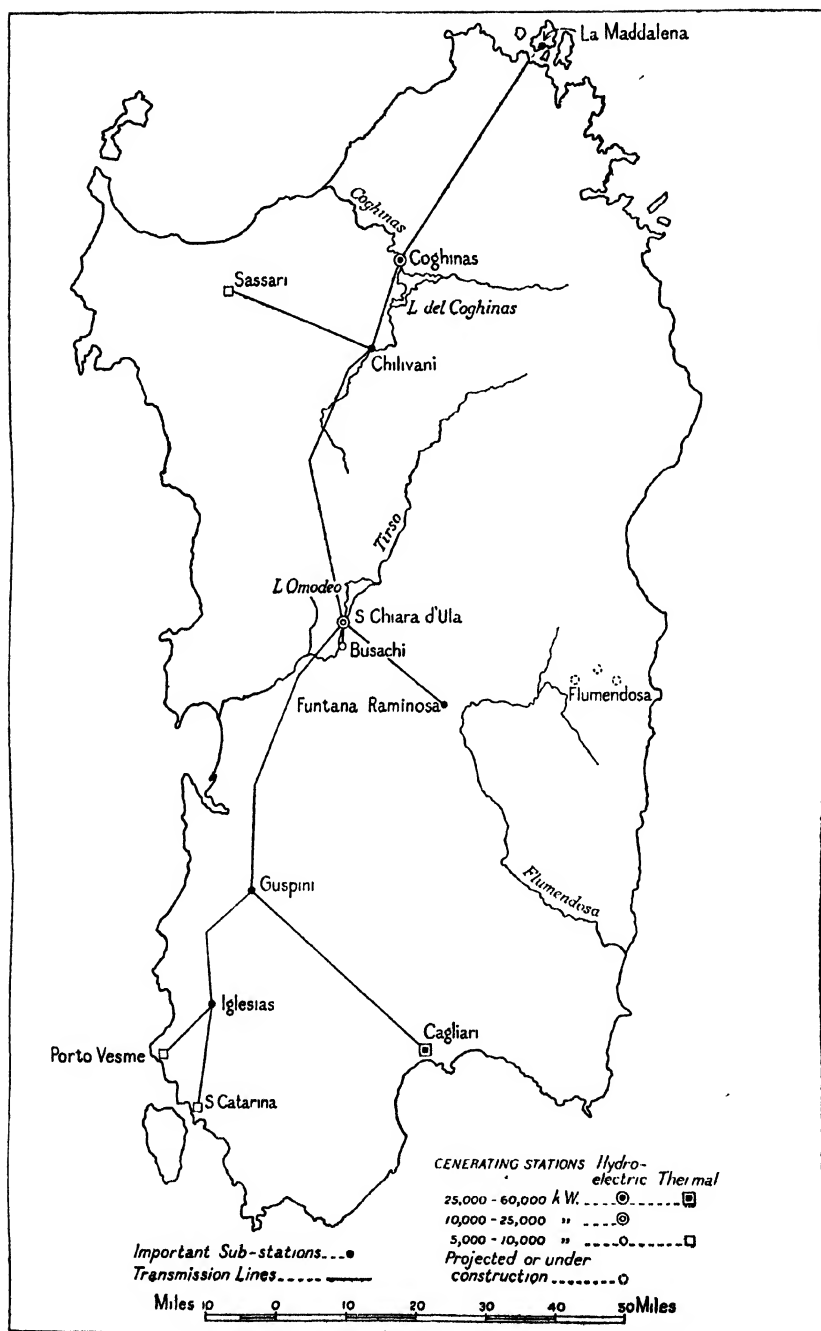


FIG. 49. Electricity supply of Sardinia

nuraghi. Outstanding examples are those at Sardara north-west of Sanluri and at Giara di Serri near Mandas. The Romans also used some of the mineral springs. Mineral waters which are now used include those at Castel Doria, S. Lucia di Bonorva, Benetutti, Fordongianus, Sardara, S. Giovanni di Dorgali, and Acquacotta, and table waters are bottled in modern factories at Sassari, Bonorva, Montes, and Sardara, the last being specially used for hydrothermal cures.

Electricity (Fig. 49)

Sardinia's electricity supply is derived principally from two hydro-electric and two thermal stations, which have been constructed during the past 20 years or so. The production of power in 1938 was only 173 million kWh., little more than 1 per cent. of the total for the whole of Italy.

Conditions for the exploitation of water power in Sardinia are less favourable naturally than in any part of the Italian mainland or even in Sicily (Chapter XVII). The rainfall is not only small in most areas but is very seasonal, 70 per cent. falling in winter and spring, when, partly because of the impermeability of the surface rocks, wild and destructive torrents fill the river beds. In contrast, during the long, hot, and dry summer when evaporation is at a maximum, the streams become mere trickles and the abandoned channels degenerate into unhealthy malarial swamps. Although the island is mountainous there are no glaciers or large natural lakes, so that nowhere is it possible to regulate the flow of water without building dams and creating artificial reservoirs. Fortunately the wide distribution of impermeable rocks has facilitated water storage, especially in the Tirso basin, where virtually no water is lost through subterranean leakage. Here, in particular, the Government has endeavoured to conserve flood water, not only for the generation of electricity, but also to irrigate the land during the summer drought as well as to mitigate the destructive run-off in winter.

<i>Name of station and year of opening</i>	<i>Position and water-supply</i>	<i>Capacity in kW. (1937)</i>	<i>Head in ft.</i>	<i>Use, &c.</i>
Coghinas (? 1926)	F. Coghinas. Fed by artificial lake SW. of Tempio Pausania	27,000	c. 200	Local synthetic ammonia works and arsenal at La Maddalena. Underground station.
S. Chiara d'Ula (c. 1922)	F. Tirso. Fed by L. Tirso (Omodeo)	c. 20,000	c. 200	Nitrogen plant of the <i>Soc. Ammonia e Prodotti Nitrici</i> .
Flumendosa I, II, III	F. Flumendosa. Fed by artificial lake NW. of Lanusei	15,000	..	Project. Building 1936, but work subsequently suspended.

The valleys of the Coghinas, Tirso, and Flumendosa have all broad, open upper basins, with narrow, deeply incised valleys farther downstream. The impounding of lakes above the gorge sections of the valleys has thus been favoured. Moreover, the cost of erecting dams has been reduced by the abundance of resistant and impermeable building stone in the island. Work on the Tirso project began in 1919, and the major part of the undertaking was completed in about three years. This involved the building of a large dam and power station at S. Chiara d'Ula, above which extends Lake Tirso. About 3 miles downstream, near Busachi, a small automatic station of 3,500-kW. capacity is controlled from the main station at S. Chiara d'Ula, which is capable of generating 50 million kWh. annually. In the north of the island the F. Coghinas has been dammed near Oschiri to form an artificial lake with a capacity of about 53,000,000,000 gallons. Since the river has a very irregular flow, it has been necessary to make elaborate arrangements to deal with heavy surpluses of water which sometimes accumulate with great rapidity. The nearby power station generates current mainly for the Sarda-Ammonia company (p. 598). The damming of the F. Flumendosa near its source aims at supplying power for three new stations.

In addition to the above hydro-electric stations Sardinia makes use of the following important thermal stations:

<i>Name of station and year of opening</i>	<i>Position</i>	<i>Fuel</i>	<i>Capacity in kW.</i>	<i>Use, &c.</i>
S. Catarina (1939)	Mainland opposite island of S. Antioco	Coal from the Bacu Abis mines near Iglesias	50,000 kVA.	Carbonia mines; also dock installations at Portoscuso, Porto Vesme, and Porto Ponte Romano. Probably reserve and peak-load station.
Cagliari (1926)	3 miles NW. of Cagliari		26,000 kW.	

Other thermal stations are small and of purely local significance, e.g. Sassari and Monteponi.

The main transmission line, at 60 kV., extends southwards from Coghinas by way of Chilivani sub-station to S. Chiara d'Ula and thence to the important Guspini sub-station, where it links south-east with Cagliari and south-west with Iglesias, S. Catarina, &c. In addition to the high voltage grid there is also an extensive network (mostly 15 kV.), designed to supply current for lighting.

The greater part of the island uses 3-phase A.C. at 50 cycles, but D.C. is also generated. The local voltage at Cagliari is 150/260 A.C. In addition to A.C., Tempio Pausania is supplied with D.C. at 110 V. and La Maddalena D.C. at 125 V.



PLATE 59. *Laconi at the eastern edge of Arborea*



PLATE 60. *Lanusei in Ogliastro*



PLATE 61. *A 'Lolla' in the Campidano*



PLATE 62. *A balcony characteristic of eastern Sardinia*

POPULATION

SARDINIA, according to the census of 1936, had a resident population of 1,034,206. This is probably as great as it has ever been. About the third century B.C. it is estimated that, under Carthaginian domination, there were 400,000 inhabitants. Some authorities calculate that there were 2,000,000 people in the days of the late Roman Republic and that about 500,000 of these were exterminated or sold into captivity. Though these figures are, with little doubt, considerably exaggerated, 500,000 being a more reasonable total, it is probable that at this time about a quarter of the population were deported or killed. In the fifth century A.D. a reliable source gives the population as 350,000, and in the eleventh century the figure was the same. The population decreased considerably from the eleventh century to the sixteenth, when there were continuous wars between the Pisans, Genoese, and Aragonese, and field cultivation and the mines were almost abandoned. In 1485 an official estimate of the population gives the figures as between 158,000 and 240,000, which means the island had an average density of about 25 per square mile. In the sixteenth century the population increased, despite the pestilence of 1582, and in 1603 the estimate of the island's population was 270,000-300,000. About seventy years later (1678), after a period of prosperity which offset the epidemics of 1652 and 1653, the population had risen to 310,000-335,000. The famine and pestilence of 1680 brought about the death of 80,000-90,000 persons, causing the population to drop to 230,321 in 1688. At the beginning of the domination of the house of Savoy in 1718 the island had certainly not more than 300,000 inhabitants. The following table indicates the growth of the population since 1728:

1728	310,000	1861	588,064
1751	360,000	1871	633,660
1782	440,000	1881	682,002
1821	462,000	1901	791,754
1824	492,000	1911	852,407
1838	524,642	1921	864,174
1845	543,207	1931	973,125
1858	573,115		

The increase in population has, therefore, been fairly steady from the eighteenth century to the present day. During the nineteenth century the only minor set-back was due to the cholera epidemic of 1854-1855.

The island consists of one compartment with three provinces,

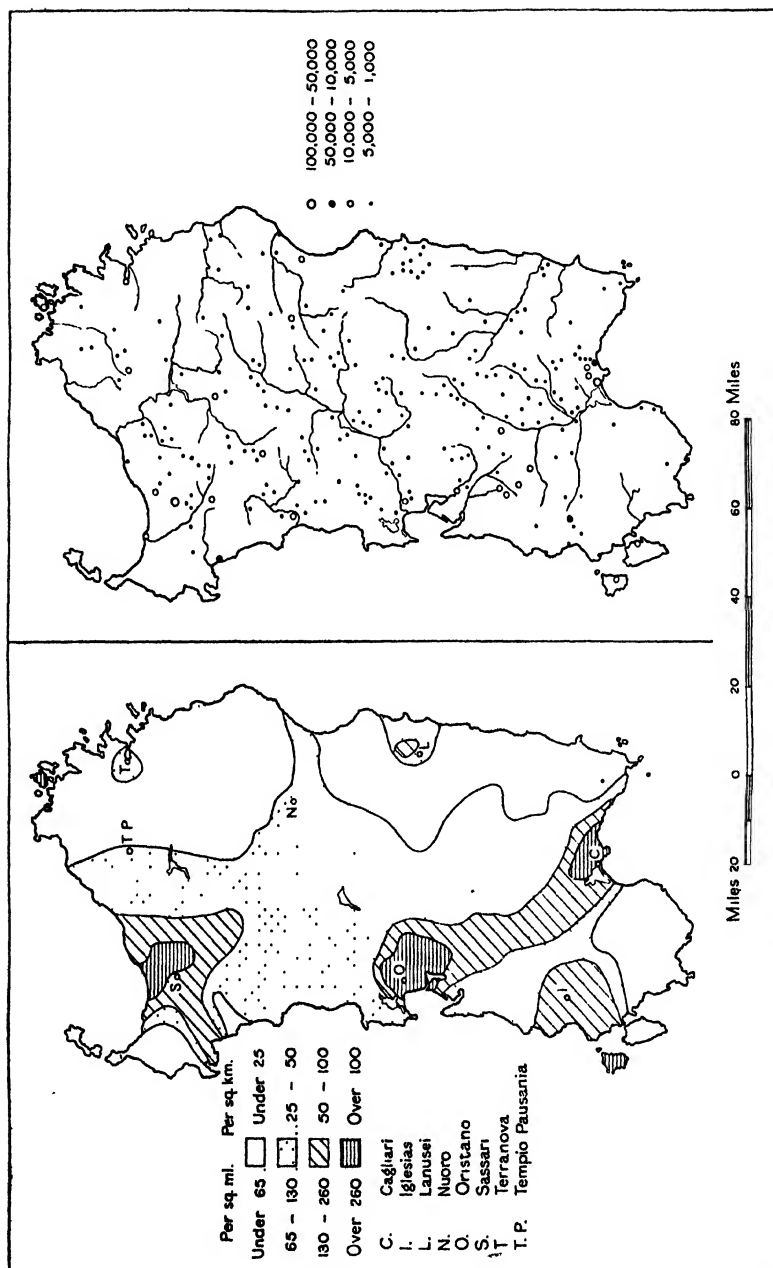


FIG. 50. (a) Density of population, 1931; (b) Distribution of centres with over 1,000 inhabitants

Cagliari, Nuoro, and Sassari (II, p. 659). These latter are divided into 278 communes, 118 being in Cagliari province (area 3,587 sq. mile), 88 in Nuoro province (area 2,808 sq. mile), and 72 in Sassari province (area 2,903 sq. mile). About 92 per cent. of the Sardinian population lives in compact villages and towns, and only 8 per cent. in scattered dwellings. The percentage of scattered population is the second lowest in Italy (Apulia 6·7 per cent.) and is very much smaller than the Italian average of 26·2 per cent. (II, p. 509).

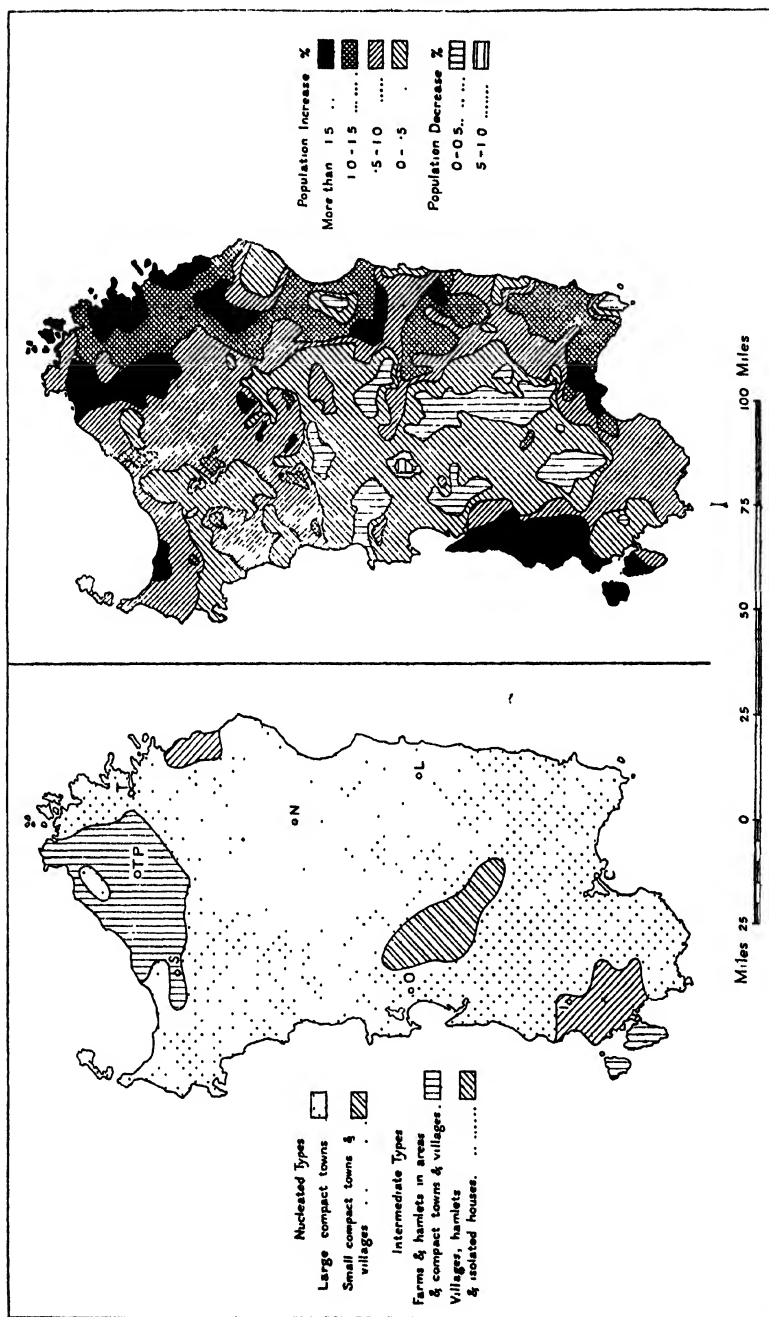
The average density of the population of Sardinia is 111 per sq. mile, and is lower than any other Italian compartment, the average density of the whole country being 360 per sq. mile. The provinces of Nuoro and Sassari, with densities of 80 and 104 per sq. mile respectively, have the lowest densities of all Italian provinces.

The average settlement in Sardinia has a population of 2,000–5,000, though many have 1,000–2,000. There are only 12 communes with a population of more than 10,000. The largest urban centres in the island are: Cagliari (98,632), Sassari (44,130), Alghero (14,579), Iglesias (13,860), Quartu S. Elena (12,104), Nuoro (10,820), Oristano (9,454), Monserrato (9,136), Ozieri (9,091), La Maddalena (8,740), and Carloforte (8,030). About 384,468 persons live below 100 metres above sea-level, 268,215 between 100 and 300 m., 169,963 between 300 and 500 m., 132,132 between 500 and 600, and 79,418 above 600 m. (II, p. 660).

According to the 1936 census, of the occupied population of 375,735 (over 10 years of age), 213,047 were employed in agriculture and fishing, 101,167 in industry and commerce, 15,162 in transport, 19,427 in public administration, and 22,139 in domestic service. Accordingly about 56 per cent. of the population were employed in agriculture and fishing, as against 48 per cent. in the whole of Italy. The bulk of the agricultural population lives in towns or large villages.

Vital Statistics

The Sardinian birth-rate is fairly high, being 26·4 per thousand in 1940, though the average for Italy was 29·8, and for the United Kingdom only 15·3 (1939). The percentage of illegitimate births is only 3 per cent. and is moderate for Italy. The death-rate in the same year of 13·5 per thousand, when 14,985 persons died, closely approximated to the Italian average of 13·6. Altogether in 1940 there were 34,514 live births and an excess of births over deaths of 19,529, or of 17·6 per thousand. This is the highest figure for any compartment in Italy, Calabria being the second highest in 1940 with 16·1,



(a) Types of rural settlement; (b) Population changes

whilst Piedmont had an excess of only 0.8. Cagliari has the second highest excess of any province (19.1 per 1,000) as against 19.2 for Littoria and, at the other extreme, of -1.9 for Imperia, on the mainland. In 1940 there were 8,728 marriages, the equivalent of 7.9 marriages per 1,000 persons.

Regional Distribution of Population

The greater part of the Sardinian population, although mainly agricultural, lives in compact centres of 1,000 to 2,000 persons. The unsettled and turbulent history of the island has caused this concentration. Since Roman times pirates have, until recently, been a danger, whilst the island has been subject to a constant series of invasions since the beginning of historical times. The inhabitants have, therefore, been compelled to live in large groups for protection, especially in areas near the coast or in regions where movement is easy and defensive sites rare. In pre-Roman times the great bulk of the population lived near the coast or on the plains; after the break-up of the Roman Empire there was a movement inland to the mountainous regions where there were good defensive sites. The mining districts were abandoned, the cultivation of the plains given up, and most of the population became pastoralists. It was not until the end of the last century, when the yoke of feudalism was thrown off and the danger of invasion seemed past, that the people left the hill sites and settled in more fertile areas and that the mines were again worked. The feudal system, which does not encourage private enterprise even on the land, has also helped to keep the population in nucleated settlements. To-day the only districts where there is a scattered population are the mining districts of Sulcis in the south-west and the district around Sassari and Gallura in the extreme north, where types of settlement have been influenced by Corsican infiltration. In these districts about 35-40 per cent. of the population live in scattered settlements. The inhabitants of the Sulcis region live in a type of settlement called *stazzi*.

In Sardinia to-day the areas of densest population are round Cagliari and Oristano, in the Campidano lowland linking the two towns, in the mining area of the Iglesiente, and in the north-west round Sassari. In these regions the average density is 130-260 per sq. mile with patches over 260. The mountain regions of the west and central parts have an average density of 65-130 per sq. mile. In the eastern mountain regions the average density is as low as 25-65 per sq. mile, though on the coastal lowlands round Lanusei and

Terranova there are districts with 65-130 per sq. mile. The island of S. Pietro off the west coast has a density of 130-260 and of S. Antioco of 65-130 per sq. mile.

The North-West. The Nurra and the district round Sassari have a comparatively scattered population for the island. The area of densest population is in the Sassari district, where some large villages and hamlets are situated on the ring of high tableland encircling the city on the south-east and east. On the lower country north-west of the city there are numerous scattered dwellings mainly served by lanes and tracks laid out in no particular pattern. Sassari (44,130; 738 ft., p. 636), which is situated on the side of a steep hill, is a brisk commercial city. Its medieval walls and castle have been pulled down and wide streets, imposing squares, and public gardens have been laid out. The towns and villages on the hills to the south-east and east are generally compact and closely built on good defensive sites. The majority of them are of Genoese origin and some are guarded by medieval castles. The principal of these settlements are Tissi (1,384; 771 ft.), Ossi (4,072; 1,089 ft.), Osilo (4,903; 2,201 ft.), Sennori (4,314; 909 ft.), and Sorso (7,405; 446 ft.). Osilo is dominated by a fine castle built by the Malaspinas. There are also some villages round the coast of north-west Sardinia, unlike the east coast, where towns a mile or so from the sea are the general rule. Alghero (14,579) and Porto Torres (6,438) are the most notable ports, and Stintino (Istintino, 696) and Castel Sardo (2,692; 374 ft.) are the larger of the coastal villages. Alghero, on the west coast, was originally built in the twelfth century by the Dorias as a centre of Sardinian trade with Genoa, but in the fourteenth century fell into the hands of the Catalans who colonized it. To-day the town and its people retain much of their original Spanish characteristics. The medieval town walls, which rise straight from the sea, the cathedral, and a number of old houses make the town most attractive and appear almost medieval. The coral and tunny fisheries are of some importance, whilst there are also some canning factories as well as cadmium mines near by. The town is a small bathing-resort, whilst the grottoes near Cape Caccia have attracted many distinguished visitors. Porto Torres (p. 633) on the north coast is Roman in origin and its site retains something of its Roman plan. Castel Sardo is an attractive fortified fishing-port founded by the Dorias in the twelfth century and is still dominated by a medieval castle. The other settlements in the Nurra are on the hills and are often mining-villages such as those round Miniera di Ferro and Miniera dell' Argentiera. A few small hamlets strung along

roads occur on the Nurra plain, which is practically desolate and unpopulated.

The bleak island of Asinara north of Cape Falcone has a population of 567, the bulk of which live in the coastal villages of Lazzareto and Cala d'Oliva and in Fornelli, about half a mile from the sea.

The region of Logudoro to the south and south-east of Sassari consists of highland plains and hills. The western part of the region is fairly densely populated with large villages or small towns. These are, for the most part, very compact and closely built, and are on the main roads, and have a population of 2,000 to 5,000. The majority are in good defensive sites. The most notable of these settlements are Ittiri (7,971; 1,286 ft.), Tiesi (Thiesi 3,399; 1,512 ft.), Ploaghe (4,426; 1,401 ft.), Mores (2,964; 1,201 ft.), Villanova Monteleone (4,862; 1,860 ft.), Pozzomaggiore (4,586; 1,437 ft.) on a magnificent site, and Bonorva (7,076; 1,667 ft.). The Campo d'Ozieri in the east of the district is for the most part sparsely populated except for the compact town of Ozieri (9,091; 1,280 ft.), which is an important route-centre and agricultural market, principally for cattle and cheese.

South of Logudoro there is a series of wide lava plateaux incised by valleys; the principal of these plateaux, the Campeda and Abbasanta plateaux, are generally edged with steep scarps and merge into the extinct volcano of M. Ferru in the south-west and into the Campidano in the south. The Campeda plateau is higher, more barren, and more sparsely populated than the Abbasanta plateau, where large compact agricultural villages and towns occur at wide intervals at the plateau edges. Some of the principal towns are along road 129, where it follows the foot of the scarp marking the drop from the Campeda to the Abbasanta plateau. Here are the towns of Macomer (4,950; 1,808 ft.), which is an important gap town, road, and railway junction, and centre of the wool industry, Bortigali (2,601; 1,673 ft.), and Silanus (2,674; 1,440 ft.). These towns are mostly squalid and consist of low, ugly houses. Amongst the larger of the agricultural villages or towns on the Abbasanta plateau are Abbasanta (1,613; 951 ft.), Ghilarza (3,258; 951 ft.), Sedilo (3,157; 945 ft.), and Paulilatino (3,183; 917 ft.). The northern, eastern, and south-eastern slopes of the M. Ferru have several large agricultural villages, the most notable of which are Cuglieri (4,895; 1,572 ft.), a minor centre of the olive industry, Santu Lussurgiu (4,264; 1,650 ft.), Seneghe (2,435; 984 ft.), Milis (1,357; 249 ft.), S. Vero Milis (2,090; 33 ft.), and Narbolia (1,477; 187 ft.). The southern and

south-eastern slopes of the plateaux where they adjoin the Campidano are also dotted with large agricultural villages. In the plateaux country between Alghero and M. Ferru the only notable settlement near the coast is Bosa (6,828; 33 ft.), a cathedral town built on the north side of the estuary of the river Temo, about a mile from the sea. The town, which is guarded by a ruined fortress on a hill to its north, is famed for its Malvasia wine, lace, dried figs, and artichokes. Inland the only other large settlements are Sindia (2,591; 1,673 ft.) and Tresnuraghes (2,262; 843 ft.).

The Eastern Highlands. The main settlements of the region are on the more fertile of the eastern plateaux and plains, especially in the depressions followed by the longitudinal and transverse routes and on the mountain spurs immediately overlooking the plains. All the settlements are usually near rivers, streams, or springs. Quite a number of smaller villages occur on some of the higher plateaux which are only served by winding tracks. These are naturally the most backward villages; their houses and living conditions are often very primitive, and banditry and inter-village feuds are still quite common. Settlements on the eastern coast are rare. The population of the region as a whole is generally settled in compact agricultural villages and towns consisting of low houses packed tightly together since the site, often originally chosen for defensive purposes, is frequently constricted. The houses normally have one or two stories and an outside staircase (Plate 62). The pattern and type of the houses, however, varies considerably even within small districts. A bright, clean village with attractive houses may be only a short distance from a squalid congested settlement. In most districts the inhabitants go daily from the towns and villages into the surrounding country to their fields and flocks. During the daytime many villages are empty except for old men and women. There is little urban life in the agricultural settlements, and shops are rare. In many of the higher or more isolated mountain regions the peasants live in stone huts or tents for long periods in summer whilst tending their flocks. Some of the higher villages in the wilder valleys and plateaux are shooting and hunting resorts to which visitors come from all over the world. These villages are more up to date and better kept than their less wealthy neighbours.

Gallura, the extreme north of Sardinia, is mainly composed of wide stretches of wild granite moorland rising to jagged hills and mountains. The population here is, by Sardinian standards, scattered, and hamlets and isolated houses are quite common. The principal

settlements are, however, small compact agricultural towns. Coastal settlements are rare as the greater part of the coast is rugged and forbidding, although Terranova (p. 639) on the east coast and La Maddalena (p. 625), a naval base on the island of Madallena, are the two main settlements of the region. The only other settlements on the desolate north coast of the district are the fishing-villages of S. Teresa di Gallura (1,566; 145 ft.) and Palau (906). Both are bleak and forbidding and are built in a sprawling fashion in treeless country. The other most notable settlements are generally on the main motor-roads. The principal agricultural towns and villages are built in a ring round the head of the Liscia valley. Here Tempio Pausania (7,046; 1,854 ft.), the provincial capital, is the largest settlement. It is compactly built on a hill spur and is an important route junction and a centre of the cork industry. Other agricultural towns and villages include Calangianus (2,634; 1,700 ft.), Luras (2,515; 2,651 ft.), and Aggius (1,110; 1,686 ft.).

Most of the bleak islands of the La Maddalena archipelago are sparsely populated, with the exception of La Maddalena itself and Caprera. Isola La Maddalena has a population of over 9,000 and Isola Caprera of 118. The bulk of the population on La Maddalena lives in the straggling port itself, although there are some hamlets and isolated houses scattered throughout the island. Caprera, besides being noted for Garibaldi's tomb, constitutes part of the naval base of La Maddalena.

The granite plateaux which extend from south of Gallura to the Mi. Gennargentu are for the most part deserted, especially in the northern areas. The principal settlements are villages and small agricultural towns, which are often considerable distances from each other. They are for the most part on the main roads which generally follow depressions or run at the foot of steep plateaux edges. Coastal settlements tend to be rare, though on the plain of Siniscola is Siniscola itself (4,625; 138 ft.), about 4 miles from the sea, and on the coast the small fishing-hamlets of Sa Caletta (79) and S. Lucia (67). Larger villages on main routeways include Bultei (2,389; 1,700 ft.), Bono (4,518; 1,742 ft.), and Bottidda (1,158; 1,299 ft.) all on road 128-bis, which follows the foot of the steep scarp of the Mi. Marghine along the upper Tirso valley. Other notable settlements are on the Maiu road which crosses the plateau between Monti and Nuoro. Here the largest of the compact villages are Monti (1,100; 984 ft.), Budduso (3,860; 2,264 ft.), and Bitti (5,224; 1,801 ft.). Nuoro (10,820; 1,814 ft.; p. 631), standing above a narrow tributary valley

of the Cedrino controls the important west-east road 129. This town is rapidly becoming modernized since it became a provincial capital. Oschiri (3,098; 663 ft.), south-east of Lake Coghinas, has a notable chemical industry.

South of road 129 the plateaux and mountains of northern Barbagia extend southwards to the Mi. Gennargentu and constitute some of the wildest country in Sardinia. Population is naturally sparse. The greatest number of nucleated agricultural villages and towns are in the western part of the region and are chiefly on the main roads. The settlements are most numerous on the longitudinal road 128, which, for the most part, runs below the steep western scarp of the plateaux in the north and below the steeper western slopes of the Mi. Gennargentu farther south. These villages include Oniferi (1,093; 1,526 ft.), Orani (3,083; 1,709 ft.), Sarule (2,108; 2,054 ft.); Gavoi (2,840; 253 ft.), Ovodda (1,580; 2,356 ft.), Sorgono (2,054; 2,257 ft.), and Meana Sardo (2,481; 1,962 ft.). A number of somewhat more straggling villages are on a secondary road which runs immediately east of road 128 on the higher slopes of Mi. Gennargentu. Here are the villages of Tonara (3,362; *c.* 3,068 ft.), Aritzo (*c.* 2,445; 2,612 ft.), and Seulo (1,533; 2,615 ft.), whilst Desulo (3,843; 2,625 ft.) is on a branch of this road higher up the mountain-side. These villages straggle up very steep slopes and with their low chalet-like houses rather resemble Alpine villages. Desulo, which is very picturesque, is a favourite haunt of artists. The inhabitants of these villages, like those on road 128, depend for their livelihood on their large flocks. Most of the men leave their villages in the winter months with their sheep and goats and descend to the rich pastures of the Campidano, where they live in circular huts of straw. The women devote themselves to weaving and sewing while their husbands are away.

Fonni (4,844; 3,281 ft.), on the northern slopes of Gennargentu and on a main road from Nuoro to road 128, is the highest village in Sardinia. It aspires to be a climatic resort, and is surrounded by rich meadows and woodland which remain green throughout the year as rainfall is abundant. Other settlements west of Gennargentu are on the several minor roads in the Mandrolisai district between the mountains and Lake Tirso. These villages are for the most part small.

To the east of the plateaux and of Gennargentu there are a few large settlements along road 125 which runs 3 to 6 miles inland from the coast. Orosei (2,633; 62 ft.) is on a small coastal plain about a mile from the sea and is at the junction of road 125 with road 129. Dorgali

(6,057; 1,270 ft.), on a fine hill-site about 10 miles from Orosei, is an attractive and prosperous agricultural town where artistic pottery and leather goods form minor industries.

South of Gennargentu the mountainous country is high and for the most part sparsely populated except on the west, where there is a hilly zone including the districts of Arborea, Marmilla, and Trexenta adjoining the Campidano. In the high eastern section the main settlements are agricultural villages, which are smaller than in most parts of Sardinia, but are generally on the principal roads. Here some of the larger settlements are on road 125 near the coast, especially where there are small coastal plains, which, although still unhealthy because of malaria, are fertile. For example, on the coastal plain of Tortoli is the clean, tree-planted, little town of Tortoli (2,499; 49 ft.) with Arbatax (264) as its small port, and Muravera (2,632; 36 ft.) on the plain of Flumendosa. Muravera is a notable hunting resort for most types of game found in Sardinia as well as the centre for several mines near by. Tertenia (2,329; 456 ft.), although also on road 125, is about 4 miles from the sea. Another notable group of settlements is on road 128 which for the most part follows the depression separating the steep mountains on the east from the lower hills on the west. Along this road are Laconi (2,113; 1,821 ft.), Isili (2,570; 1,716 ft.), an attractive village and the centre of the hand-made carpet industry, Mandas (2,586; 1,499 ft.), and Senorbi (2,153; 669 ft.). Laconi (Plate 59), one of the beauty-spots of Sardinia, stands at the western base of the high calcareous plateau of Sarcidano and commands a wide view over hill and valley. The immediate surroundings of woodland and orchards and the old castle ruins make it an attractive summer resort. Other large settlements of the region do not fall into groups; in the more central parts the chief are Terzu (3,963; 1,427 ft.), Seui (2,973; 2,625 ft.), a coal-mining village, Nurri (3,223; 1,936 ft.), and Perdasdefogu (1,375; 1,695 ft.), all immediately south of the Mi. Gennargentu; and Lanusei (4,045; 1,952 ft.; Plate 60), Ballao (1,327; 322 ft.), an antimony-mining and a hunting centre in wild attractive country, and S. Nicolo Gerrei (1,316; 1,198 ft.), all of which are at road junctions. Lanusei is, for Sardinia, an up-to-date town mainly because it is one of the most famous hunting centres in the island and a recognized headquarters for sportsmen.

Almost all of the mountainous region is populated only where it is possible to build roads, and the most desolate and deserted district is Sarrabus, the extreme south-eastern tip of the island, where roads are few and far between.

The districts of Arborea, Marmilla, and Trexenta consist principally of low rounded hills intersected by open valleys. The northern part of this region has a comparatively dense network of secondary roads and lanes which serve numerous small agricultural villages. These are generally on the lower hill slopes, and are smaller but closer together than is usual in the hilly parts of Sardinia. There is a notable ring of these villages around the flat-topped Planu sa Giara. The largest include Senis (874; 840 ft.), Nuragus (1,194; 1,178 ft.), Barumini (1,415; 676 ft.), and Tuili (1,613; 682 ft.). Other large settlements in this district are Ales (1,492; 636 ft.) and Mogoro (3,996; 440 ft.). South of Mogoro and Mandas the villages are somewhat larger and more widely spaced; Lunamatrona (1,612; 591 ft.) and Guasila are typical. The south-western hill slopes adjoining the Campidano have a line of large villages along road 131.

The Campidano. The Campidano, the largest plain in Sardinia (p. 528), is one of the most densely populated areas of the island, though the greater part of it only has a density of 130–260 per sq. mile. Almost all the settlements are compact agricultural villages or towns, with an average population of 2,000 to 5,000 persons. These settlements are generally made up of agricultural dwelling-houses, somewhat reminiscent of the 'corti' of the Italian mainland (II, p. 541), though not on such a large scale. The majority of the larger houses consist of buildings round a courtyard which is divided into two halves; one being devoted to the stables, grist-mill, cellars, and outbuildings, and the other—generally on the sunny west side—to the needs of the family. In the latter there is the *lolla*, a kind of veranda, on to which all the doors of the various rooms open (Plate 61). The houses and buildings are generally constructed of a brown adobe brick, and are rather dull in appearance.

The larger agricultural towns are along the edges of the plain or on the main roads traversing it. They often guard a river-crossing, especially where streams or rivers debouch on to the plain, though the more marshy and fever-ridden parts of the plain are avoided. The majority of the towns and villages are route-centres, and roads and tracks radiate from them like a spider's web. Many of them are Roman in origin as their grid-plan indicates; some owe their names to the Roman road system; for example Quarto was situated at the fourth milestone from Cagliari, Sestu, Settimo, and Decimo (now Decimomannu) at the sixth, seventh, and tenth.

Cagliari (78,632; p. 619), on the south coast of the Campidano, is by far the largest town of the island and the most important port.

Around it the population density is over 260 per sq. mile. To the west of Cagliari are salt-pans and lagoons, but to the north-east there is a series of towns which are in effect suburbs of the city. Amongst the largest are Pirri (7,386; 56 ft.), Monserrato (9,136; 7 ft.), Quartu S. Elena (12,104; 20 ft.), and Selargius (4,568; 36 ft.), whilst Sinnai (5,243; 436 ft.), about 7 miles distant, is an important centre of the basket industry. Oristano (9,454; 30 ft.), at the north-western end of the plain, has a fairly densely populated region to its north, though there are swamps and lagoons (*stagni*) immediately south and west. These swamps were being drained and cultivated by the Fascists, and the town of Mussolinia di Sardegna (571; 20 ft.) was being built on the low land west of the Stagno di Sasso. This was to be the main centre for a series of about 200 farms laid out along a grid pattern of roads. It has typical Fascist architecture and design, and was very like Littoria on the Pontine marshes (II, p. 565). The old town of Oristano, though only about 3 miles from the sea, is essentially an agricultural town. It guards a crossing of the Tirso, one of the larger Sardinian rivers, and is a notable route-centre. The town, which retains much of its medieval character, especially its narrow streets, was once the capital of the independent judgeship of Arborea in the days of the Giudichessa Eleanora (p. 566). Cabras (4,882; 30 ft.), on a lagoon to the west of the town, is a dull town with broad streets and low one-storied houses.

Other larger towns are along the edges of the plain. On the western edge, often partly on the lower slopes of the Iglesiente hills, are Guspini (8,061; 449 ft.), Gonnosfanadiga (5,822; 630 ft.), and Villacidro (7,683; 876 ft.). On the eastern side are Uras (2,913; 75 ft.), Sardara (3,541; 535 ft.), Sanluri (6,284; 443 ft.), Serrenti (3,526; 446 ft.), Nuraminis (2,290; 299 ft.), and Monastir (2,016; 272 ft.); S. Gavino Monreale (5,061; 174 ft.) with its important lead smelter, Serramanna (5,178; 108 ft.), and Decimomannu (2,144; 43 ft.) are in the middle of the plain. Sanluri, once a walled city, is particularly important as it is a route centre and one of the richer towns of the Campidano.

Iglesiente. The majority of the settlements in the Iglesiente hill region, which is comparatively densely populated for Sardinia, are connected with the mining industry, and are generally smaller than the average Sardinian village, with the notable exceptions of Iglesias (13,860; 656 ft.) and Carbonia (2,814; 328 ft.). The average size of the mining villages is about 200-500, whilst hamlets and isolated houses are not uncommon. The villages are near the mines and are

generally in valleys beside running-water or on hill slopes. The villages are not as compact as most Sardinian settlements, but are rather straggling and the houses are often widely spaced. Some of the newer coal-mining villages, especially between Iglesias and Carbonia, although better planned and with wide streets and rectangular blocks of houses, are more compact. Carbonia itself is a good example of this type of Fascist planning. The majority of the settlements are at road junctions or at the coast where a few tracks meet.

In the Iglesiente hill region to the north of the Cixerri valley the mines and the mining settlements are mainly on road 126 from Iglesias to Guspini or on minor roads leading to it. Fluminimaggiore (3,131; 266 ft.), in the valley of the R. Mannu, is one of the major mining-centres, whilst Buggerru (2,272; 131 ft.) is a small mining-port. Iglesias is on the upper slopes of the Cixerri valley and is the main town for the important mines immediately to the south of it. Here, amongst numerous other mines, are the famous Monteponi lead and zinc mines, whilst the notable Campo Pisano mine is only a mile from the town. Iglesias, a rather sprawling town, is built mainly of stone and has stone paved streets, and is, for Sardinia, rather imposing. It is an important route-centre for the mining district. South of the Iglesias mining district is the Sulcis coal-mining region, where Carbonia is important. Other mining settlements of the Sulcis district are in the R. Palmas valley.

Other types of settlement in the northern block of the Iglesiente are not numerous, although in the southern block there are a considerable number. The Sulcis district has the most scattered dwellings of the region. The plain of Sulcis itself is thinly peopled with small hamlets, and Palmas Suergiu (2,652; 52 ft.), itself rather loosely knit, is the largest centre on the plain. The other coastal plains fringing the Iglesiente mountain block are low, marshy, generally undrained and sparsely populated. Most of the settlements are 1 or 2 miles from the sea, and are not ports, and on the south-east coast of the mountain block are very compact, though those on the west are more sprawling. Sarroch (1,807; 154 ft.) and Pula (2,100; 36 ft.) are examples of this type. On the west coast Portoscuso (1,556; 52 ft.), together with Porto Vesme, is the largest settlement actually on the sea and is a port for ores from the mines, as are some of the other smaller coastal settlements farther north. The most mountainous sections of the Iglesiente both inland and on the coast are little populated. The towns in the Cixerri valley, which cuts into the east

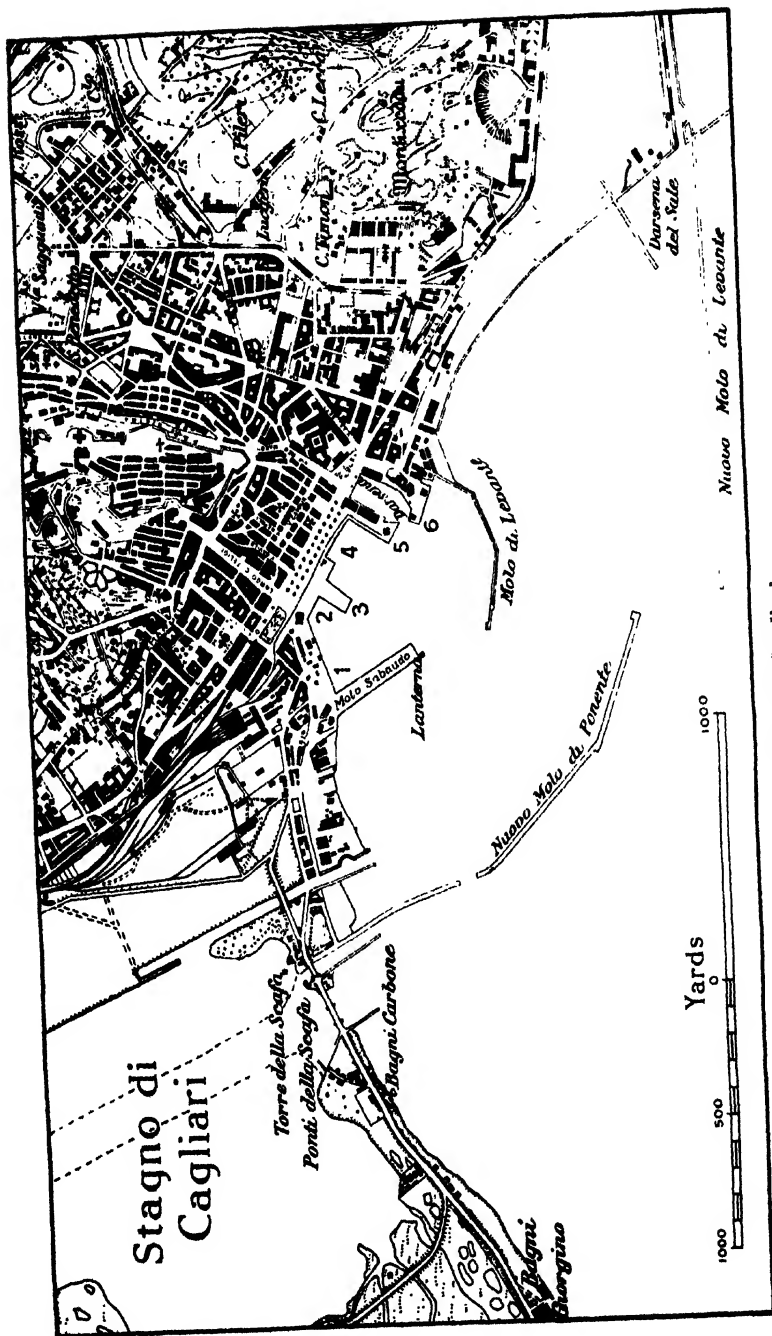


FIG. 52. Cagliari

side of the mountain block, are more like those of the Campidano plain (p. 528). The largest of these are Villamassargia (2,341; 394 ft.), Domusnovas (3,483; 469 ft.), and Siliqua (2,893; 217 ft.).

The islands of S. Pietro and S. Antioco are densely populated for Sardinia, the bulk of the population living on the east side of the islands. The population of S. Pietro is very scattered, and the bulk of the people dwell in isolated houses, although the port of Carloforte (c. 8,000), from which ores from the mines of the mainland are shipped is very compact. It was originally colonized by the Genoese and is more reminiscent of an Italian mainland town than of Sardinia. Most of its houses have three or four stories with balconies and the town is prosperous and clean in appearance. It has developed some industries as a result of its connexions with the mines. The two principal settlements on S. Antioco are S. Antioco (c. 6,775; 49 ft.) and Calasetta (2,419; 95 ft.), both ports. S. Antioco, Carthaginian in origin, was the original Sulcis and the capital of the district called after it. It was an important port and a wealthy city with a high standard of civilization. In Roman times it increased in wealth, but the ravages of Saracen pirates in the early Middle Ages caused it to be abandoned to them. Its prosperity has been on the increase since the seventeenth century (p. 543).

CITIES AND PORTS

CAGLIARI. Latitude 39° 12' N. Longitude 9° 6' E. Population 78,632. Provincial capital. Seat of archbishopric. Chamber of Commerce. British consul.

Position and Site (Fig. 52; Plates 63 and 64)

Cagliari, the capital and chief port of Sardinia, is on the south coast at the head of the gulf of Cagliari. This gulf is open to the south-east and its head is formed by two long sandy beaches facing south-east, separated by the rocky headland of S. Elia. The harbour is entirely artificial and lies between this headland and the western of the two beaches.

The town, adjoining the harbour, lies north-west of the headland, and dominates the south-eastern end of the fertile Campidano plain. Extensive lagoons (Stagno di Cagliari) cut up by islands and causeways stretch about 5 miles inland behind the long beach west of the town. A considerable part of the Stagno di Cagliari and of the low land behind the eastern beach is mainly used as salt pans. North-east

of the town, undulating cultivated plains stretch some 7 miles to the foot of hills rising to over 1,000 feet, but around and in the town itself are a number of steep isolated hills about 300 feet high. The old nucleus of the town is built on one of these hills about half a mile north-east of the inner harbour, and encloses the cathedral, university, law courts, and other public buildings. The business centre of the modern town lies between the abrupt slopes of this hill and the harbour, from which it is separated by a broad quayside boulevard, the Via Roma, leading north-west to the main railway station. Most of the industrial areas are immediately north-west and east of the town, and in the satellite villages of Pirri and Quartu S. Elena.

History

Cagliari has, from very early times, been the chief city of Sardinia. It was a flourishing Carthaginian settlement, of which traces survive in the extensive Necropolis. The Romans knew it as Carales, and under their rule it became a rich and splendid city. It was the seat of government and the principal grain port in the island; villas lined the sea-shore, and the amphitheatre was large enough to seat 20,000 spectators. During the early Christian era Cagliari was an ecclesiastical centre of some importance and the seat of a bishopric. There followed a period of decline, marked only by the gallant resistance of the citizens to Saracen raids. In the days of the rule of native judges, Cagliari again came into prominence as the capital of the most important of the *guidicati*. On the extinction of the *guidicato* in the thirteenth century Pisa gained possession of the city. Fortifications were erected round the ancient nucleus known to-day as the Castello, and of these defences the Torre di S. Pancrazio and the Torre dell' Elefante are the principal survivals. In 1324 the Castello fell to the Aragonese and, from the final eviction of the Pisans in 1327, it became the bulwark of Spanish power in Sardinia. The city was largely repopled with Catalans, and it received privileges analogous to those of Barcelona. Spanish rule in Cagliari ended in 1708, when it was bombarded by the English fleet, and occupied by Admiral Luke in the name of Charles of Austria. In 1720 Victor Amadeus II on being made King of Sardinia, took possession of his new capital. Cagliari showed itself conspicuously loyal to the house of Savoy and became the royal residence during the French occupation of Turin. Charles Albert took much interest in the city's welfare, expressing himself in his diary as dissatisfied with the condition of the civic

hospital and founding a lazaretto in the neighbourhood. From the days of the Risorgimento the city has increased both in size and prosperity.

The University was founded in 1596 and remodelled in the eighteenth century by Charles Emmanuel III. It has a fine library, which includes a fourteenth-century manuscript of the *Divina Commedia* and the original Code of Law (Carta di Logu) promulgated by Eleanora of Arborea in 1395. The cathedral of Sta. Cecilia was completed by the Pisans in 1312, and was afterwards altered and modernized. Among features of special historic interest are the two ambones, being halves of the twelfth-century pulpit from the cathedral of Pisa, presented to Cagliari when it was moved to make way for the famous pulpit of Giovanni Pisano.

Industry

Cagliari is the most industrialized town of the island, but its manufactures are on a small scale. The chief product is salt, of which 350,000 tons were exported from Sardinia in 1938. A small quantity of bromine is produced at the Sta. Gilla salt-pans. Other chemical products include superphosphates, hydrogen and oxygen gases, and pure alcohol. Refractory materials are also made, and there are brick and cement works in the neighbourhood. Several mining companies, including the antimony works at Su Suergiu and a number of the Iglesias zinc works, have offices in the city.

In addition to paper mills at Quartu S. Elena, tanneries, flour mills, and soap and tobacco factories, there are also establishments making wine, beer, liqueurs, preserved food, and cheese.

Description of Port

The harbour of Cagliari is entirely artificial and consists of an old inner harbour with moles on the west (Sabaudo) and south (Vecchio Molo di Levante) and a newer outer harbour protected by breakwaters on the south-west (Nuovo Molo di Ponente) and south-east (Nuovo Molo di Levante). The port owes much of its present importance to the development of the island's lead and zinc industry. There is also a considerable export of salt from the nearby pans, and the port has recently been developed as a secondary naval base, chiefly for destroyers and submarines.

The approaches to the harbour are deep and unobstructed, and the entrance, east of the head of the Nuovo Molo di Ponente, has depths of more than 30 feet over a width of some 1,200 feet. Although the

eastern part of the outer harbour is shoal, depths of 28 and 29 feet are dredged in the western half along the passage to the inner harbour.

Of the two outer breakwaters, the Nuovo Molo di Levante is still incomplete. Built westwards from a point about 1,500 yards south-east of the inner harbour, it was intended to be 4,000 feet long, but so far only about half has been finished. Immediately north of its root is the mouth of the Canale di S. Bartolomeo, which leads eastwards to the Quartu salt-pans and is used by salt-lighters. On the north side of the mole a breakwater projects south-west 870 feet to form a shallow wet dock, the Darsena del Sale, used by these lighters. The eastern shore of the outer harbour, north of this breakwater, is sandy and undeveloped, although some reclamation of the swamps behind the sea-wall has taken place in recent years in connexion with the development of a new naval arsenal.

The Nuovo Molo di Ponente extends south-south-east, south-east, and east-south-east for nearly a mile from a point on the shore about $\frac{1}{2}$ -mile west of the inner harbour. It is quayed on the inside and used by waiting vessels. About 525 yards from the root a gap, 210 feet wide with depths of about 14 feet, has been left for the use of small craft. The shore between this outer breakwater and the western mole of the inner harbour is low and sandy, shoal, and undeveloped. Two canals, one on either side of the root of the Nuovo Molo di Ponente, lead to the Stagno di Cagliari, a large lagoon west of the town. The westernmost of the two canals, the Saline or Scaffa canal, is a dredged channel about 500 feet wide whose entrance is protected by breakwaters. After passing under a bridge it crosses the north-east end of the lagoon to Elmas seaplane station and Decimomannu, about 10 miles from the sea. The eastern canal, the Industrial canal, has a least width of 100 feet and depths sufficient for lighters. It is entered between parallel breakwaters and then passes under a bridge before turning west to join the former canal.

The inner harbour is formed by the Molo Sabauda on its west and the Vecchio Molo di Levante on its south-east and south. The former, originally a narrow breakwater and later widened, is straight, and the latter is in three legs. Both are quayed on the inside, the entrance between them, facing west-south-west, having a width of a little more than 800 feet with depths of 27 to 30 feet. The whole of the shore-line of the inner harbour is quayed, and there are two jetties, the Pontile della Sanita (3) and della Dogana (5), projecting south-westwards from the north-east side. The Molo della Capitaneria (6),



PLATE 63. *Cagliari from the sea*

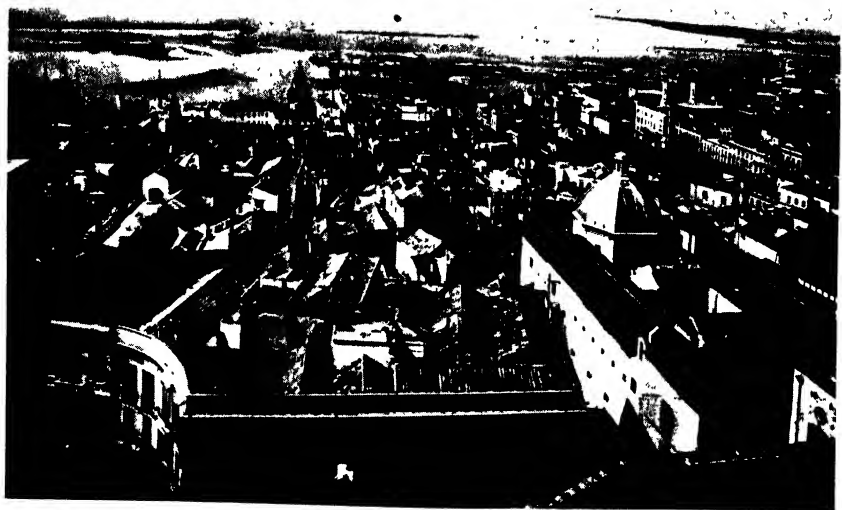


PLATE 64. *Cagliari*

No.	Name	Depth alongside (feet)	Length	No. of cranes	Facilities, &c.
	Molo Sabaudo Head	22 (SW. end); 26 (NE. end)	200	—	Suitable for heavy cargo. NE. side normally used for handling salt, brought by lighter from the salt-pans. Mooring-bollards on quay. Outer side of mole is fronted by loose blocks and surmounted by a parapet.
	North-east side	25 to 30 (average 28.5)	1,080	2	
1	Banchina di Sant' Agostino	28 to 32 (average 30)	900	2	Stone; suitable for heavy cargo. Used for loading coal (coal dump behind quay), cereals, minerals, timber, and mixed cargo. Mooring-bollards on quay.
2	Calata del Littorio	29 (NW. end); 27 (SE. end)	310	1	Stone; suitable for heavy cargo.
3	Pontile della Sanita North-west side	24 (outer end); 27 (inner end)	390	—	Mooring-bollards on NW. and SE. sides.
	Head	22.5	200	1	Wall and lines of closely planted trees separate base of jetty from Via Roma. Crane at E. corner of outer end. Dente della Sanita is a square quay block at corner of Pontile della Sanita and Banchina di Via Roma.
	South-east side	23 to 29.5	400	1	
4	Banchina di Via Roma	16 (NW. end); 23 (SE. end)	575	1 2	Stone; suitable for heavy cargo. Used for coal, cereals, timber, and mixed cargo.
5	Pontile della Dogana North-west side	16 to 19 alongside; 29 at 30 ft. off	520	—	Customs quay; stone. Used normally for passenger ships. Customs-house (1-story) and large warehouse on quay. Mooring-bollards and fenders.
	Head	16 to 21	220	—	
	Darsena (wet dock) North-west side	16 (outer end); 11 (inner end)	650	—	Normally used by trawlers, tugs plying to and from the salt-pans, sailing-craft and fishing-boats.
	North-east side	11	290	—	Many mooring-bollards on quays. Large warehouse at SE. corner of dock.
	South-east side	8 to 16	900	—	
6	Molo della Capitaneria South-west side	16 alongside; 29 at 25 ft. off	440	1	Stone; suitable for heavy cargo. Used normally for loading live-stock and general cargo. Slipway E. end. Catamarans should be used, as there is a charted depth of only 16 ft. close alongside.
	Vecchio Molo di Levante (N. side) Outer section	16 to 19	770	—	Parapet behind quay. Normally used for berthing naval craft and for oiling, ships mooring stern-to. Mooring-bollards every 12 or 15 yards. Three pipes (6 to 12 in diameter) run whole length of breakwater. Pumping-station behind base of breakwater.
	Centre section	13 to 16	655	—	
	Inner section	13 to 19	555	—	

extending west-north-west from the root of the Nuovo Molo di Levante, partially closes the entrance to the Darsena, the basin south-east of the Pontile della Dogana.

The quays of the inner harbour are from 4 to 6 feet high, those north-west of the Pontile della Dogana being 6 feet. Ships usually load and discharge alongside.

Facilities. The office of the Captain of the Port is behind the south-east quay of the Darsena, and the pilots' office is at the head of the Molo della Capitaneria. The customs-house is at the root of the Pontile della Dogana.

In addition to numerous fishing-vessels attached to the port, there are tugs and a large number of barges and lighters for the salt trade.

In the harbour area the only warehouses are: one behind the north-west quay, the Banchina di S. Agostino, two (including the customs-house) on the Pontile della Dogana, and one at the south-east corner of the Darsena.

The coal store is behind the centre of the Banchina di S. Agostino, and vessels are bunkered at that quay. None of the five oil installations given in Appendix II is in the port area, although the first is connected to it by pipe-line. There are water hydrants on the Pontile della Dogana, on the quay to its north, the Banchina di Via Roma, and on the quays of the Darsena.

Minor repairs can be executed in the shops which surround the slip at the root of the Molo della Capitaneria. Details of this slip, which faces south-south-west, are as follows: extreme length, 98 ft.; length of cradle, 82 ft.; depth over blocks at M.H.W.S. 8 ft. 6 in. aft, 4 ft. 6 in. for'd; lift 200 tons.

From the main station 300 yards north-west of the harbour a standard-gauge line continues south-east to the root of the Pontile della Sanita, and thence, as 2 tracks, along the face of the Banchina di Via Roma. From it there are spurs, back along the Banchina di S. Agostino and, by turntables from this line, to the north-west side of the Pontile della Sanita, via the quay to its north, the Calata del Littorio; and, by turntable, along the south-east side of the Pontile della Sanita, and the north-west side of the Pontile della Dogana. Narrow-gauge lines from the station south-east of the harbour pass along the water-front inland of the standard-gauge lines, serve the centre of the Pontile della Dogana, and enter the warehouse behind the Banchina di S. Agostino, but at no point do these lines serve the quay sides.

All quays have direct and easy access by road to the Via Roma

which runs north-west to south-east behind the harbour, and thence to the town and the main roads inland.

Trade and Connexions. The main imports are coal, machinery, building materials, and foodstuffs, and the principal exports are salt, lead and zinc ores, cereals, wine, charcoal, flour, and livestock.

Statistics of shipping, goods handled, and passenger traffic are as follows:

		1938	1939
Ships entered:	number	1,530	1,543
	tonnage	1,049,000	963,000
cleared:	number	1,527	1,540
	tonnage	1,051,000	959,000
Goods landed:	tons	323,000	287,000
	loaded: tons	591,000	645,000
Passengers	disembarked	11,109	9,196
	embarked	10,502	7,804

There is a weekly connexion with Naples and a fortnightly via other Sardinian ports to Genoa. The weekly Genoa-Palermo and Genoa-Tunis services call, the former giving connexion with other Sardinian ports.

Inland Communications

Railways. Cagliari is the headquarters of the State Railways in Sardinia, and is served by the main standard-gauge line of the island which runs to Terranova Pausania. Cagliari is also served by the Complementary Railways line to Arbatax.

Roads. The east coast road (125) from Terranova, road 131 from Sassari, and road 130 from Iglesias, as well as the main road from Pula and Porto Botte, all meet at Cagliari.

Airways. Seaplane services formerly operated from the Elmas station on the north-west shore of the Stagno di Cagliari to Lido di Roma and to Tunis and Genoa. At Monseratto, 6 miles north-east of Cagliari, there is an airfield.

LA MADDALENA. Latitude $41^{\circ} 13' N$. Longitude $9^{\circ} 25' E$.
Population 8,740.

Position and Site (Fig. 53)

The town and naval base of La Maddalena are not on the Sardinian mainland but on Isola Maddalena, the most central island of the

archipelago which lies east of the northern end of Sardinia. This island and Isola Caprera to the south-east are the largest in the group, and the smaller Isola S. Stefano lies in the narrow channel which separates them from the Sardinian shore. A fourth island, Isola Spargi, lies west of Isola Maddalena, with other smaller islands farther north, off the eastern entrance to the strait of Bonifacio. The main roadstead for commercial shipping is north-west of Isola S. Stefano, and is partly enclosed by Isola Maddalena to the north. The town and harbour of La Maddalena is on the south coast of Isola Maddalena, and is connected by ferry with the Sardinian mainland through the small port of Palau, the terminus of a road and railway. The Naval Base is built east of the town on the south shore of Isola Maddalena and is connected with Isola Caprera by a causeway; the main naval anchorage lies between Isola S. Stefano and Isola Caprera.

La Maddalena town is built on flat ground adjoining the harbour and consists of a disorderly array of 3- to 4-story houses, the most conspicuous building being a college on a slight hill on the outskirts of the town. A system of local roads radiates to various defence positions on Isola Maddalena, and a similar system of roads run from north to south on Isola Caprera. The surroundings of the town are generally rocky and barren, and are deserted except for granite quarries.

History

The archipelago of La Maddalena was known to the Romans as *insulae Cuniculariae*, and in the Middle Ages the Pisans built a watch-tower at Guardia Vecchia, the highest point of the island which now gives its name to the group. Farther inland, where it was less exposed to pirate raids, a church was built, dedicated to St. Mary Magdalene, and the homes of the earliest inhabitants grew up round it. As late as the eighteenth century, however, some 185 Corsican shepherds formed the entire population of the archipelago, then known as Isole Intermedie, owing to its position between Corsica and Sardinia. In 1767 a force from Sardinia took possession of the islands, not without protest from Genoa, who claimed rights over them on behalf of Corsica. The town of La Maddalena dates from 1770, and in 1773 the fortress of S. Giorgio was built on the island of S. Stefano. During the war between Sardinia and the French Republic, Napoleon Bonaparte, then a captain of artillery, seized S. Stefano with a company of Corsican volunteers and bombarded La Maddalena. From

1803 to 1805 the British fleet under Nelson's command was stationed at La Maddalena while waiting for the French fleet to emerge from Toulon. In a letter to Lord St. Vincent Nelson stated that the island was 'worth a hundred Maltas in position and has the finest man-of-war harbour in Europe'. He urged the British Government to acquire it, estimating that it could be purchased for £500,000. When, in January 1805, he left La Maddalena to begin the chase which ended at Trafalgar, he presented to the parish church two silver candlesticks and a crucifix 'as a small token of my esteem for the worthy inhabitants and of my remembrance of the hospitable treatment His Majesty's Fleet under my command has received from them'. These gifts and Nelson's autograph letter are preserved in the parish church. It was not until 1887 that the Italian Government began the development of La Maddalena as a naval base. It now ranks with La Spezia and Taranto among the three chief bases of the Italian Navy.

The island of Caprera is famous as the home of Garibaldi and the scene of his death in 1882. In 1856 a legacy from his brother Felice enabled him to buy the southern half of the island for the sum of £360 from an Englishman of the name of Collins. Collins continued to inhabit the northern half, and Garibaldi built with his own hands a wall separating his domain from that of his neighbour. After Collins's death the English admirers of Garibaldi bought the remainder of the island and presented it to him. The long flat-roofed Casa Bianca was for twenty-five years his favourite place of retreat. It is now a museum and a place of pilgrimage for those of many nations who honour his name. Garibaldi's tomb, a simple sarcophagus of granite, lies at a short distance from the house.

Description of Port

The port of La Maddalena is primarily a naval base, the principal establishments being on the south shore of the island and east of the town. Of the two roadsteads on either side of the Isola S. Stefano that on the north-west, the Rada di La Maddalena, is normally used by commercial vessels, while that on the north-east, the Rada di S. Stefano is the naval harbour.

The most usual approach is either from the south-east, passing south of the Isola di Caprera and then east or west of the Isola S. Stefano, or from the north-west, entering south-west of the Isola Maddalena. The approach from the north-east, between the Isola Maddalena and the Isola di Caprera, is barred to all but small craft by the causeway connecting the two islands, for the passage through

it (crossed by a swing bridge) is only about 60 feet wide, with depths of 10 feet and shoal patches in the approaches.

Anchorage is available in either roadstead, but the holding is not firm, and in both ships are exposed to westerly winds, which sometimes reach gale force.

Subsidiary Establishments. The Isola S. Stefano, almost uninhabited, is used to store oil and explosives. There are four landing-jetties, two on the south-east shore and one each on the south and north-west of the island, while the Nafta oil depot in the north-east has two oiling jetties. The northern is 170 feet long with spurs projecting from it to allow an alongside berth; the southern is 370 feet long with depths of 30 feet at the head.

On the mainland south-west of the Isola S. Stefano the small port of Palau has road and rail connexion with the rest of Sardinia and is La Maddalena's link with the mainland. Its jetty, 155 feet long with depths of 13 feet along the east side, is equipped with a railway track (0.95 m. gauge), hydrants, and two cranes, one of 2 tons and one of 35 tons. The munition depot at Lo Stentino, 1 mile eastwards, is served by a jetty, 150 feet long on its south side with depths of 10 feet at the head.

The little Isolotto Porco, off the south of the Isola di Caprera, has a small jetty on its south-east, serving its explosives magazine. It is 80 feet long with probable depths of 6 feet alongside its head.

On the Isola di Caprera the shore facing the Isolotto Porco has a jetty 170 feet long with 12 feet or more of water at its head. To its east is a rough quay fronting a mine depot, which is equipped with Decauville track. At the north end of Porto Palma on the south of the island there is a slipway about 160 feet long and 45 feet wide, with one jetty to its east and another to its south-west. The former is 170 feet long with depths of about 6 feet at its head, and the latter is 80 feet long with 11 feet of water at its head. On the west side of the island, on the south side of the Cala Stagnali and near its head, a length of quay with a jetty at either end serves the ordnance depot to its south. The quay is 150 feet long and the jetties project about 100 feet. Depths alongside are 6 feet or less. One of the jetties has a crane.

Main Establishments on Isola della Maddalena. Between Punta Nera, south-west of the town of La Maddalena, and the south-easternmost point of the island, there are five coves, named, from west to east, the Gavetta, Mangiavolpe, Chiesa, Camiciotto, and Camicia. The naval base lies along the eastern half of this stretch of shore and is en-

closed by a wall from the head of the Cala di Chiesa on the west to the Caprera causeway on the east.

Immediately east of Punta Nera there are two shallow bights, each with a landing-jetty. The Cala Gavetta is quayed on the west and north and rough-quayed on the east. Depths are from 12 to 24 feet with considerably less water alongside, and the cove is mainly used by fishing-vessels and local craft loading granite and general merchandise.

A sea-wall extends approximately 400 feet eastwards from the Cala Gavetta to the Banchina di Via Nazionale, a rectangular quay which projects from the general line of the shore in front of the town hall and is the principal commercial quay. From this the shore-line is quayed all round the Cala Mangiavolpe, which is used as a seaplane anchorage, to the head of the Cala di Chiesa. The quays are, however, of little use, for they are in more than a dozen short lengths and are quite irregular: depths are almost everywhere shoal, and only exceed 12 feet at two places, the south end of the westernmost quay in the Cala Mangiavolpe, and the southern leg of the quay on the north-west of the Cala di Chiesa. The north shore of the former cove has two short jetties, and there is a small camber on the west side of the latter. A short breakwater projects south from the point between the two coves.

The Isola Chiesa is a rocky islet lying across the mouth of the Cala di Chiesa. It has landing-jetties on its eastern, western, and southern shores, and from its south-eastern corner a breakwater extends south and then south-west for about 300 yards.

The eastern shore of the Cala di Chiesa has four small jetties, the southernmost being the ferry-landing from the Isola Chiesa. From it eastwards to the west side of the Cala Camiciotto the shore is backed by a sea-wall and broken towards its eastern end by a landing-jetty below the hospital and the short dog-legged breakwater protecting the Cala Camiciotto. This cove, used by barges and lighters, has short lengths of quay on either side of the beach at its head. Its eastern side is rough-quayed in irregular lengths northwards from the breakwater which projects west on the east side of the entrance.

The shore between the Cala Camiciotto and the Cala Camicia is roughly quayed and from it four concrete jetties project south: the two western are 255 feet long, and the two eastern 285 feet long, with general depths alongside of 10 to 15 feet. These jetties are used as coaling-berths for small craft, supplies coming from the coal depot at their root.

Cala Camicia is lined by quays which are backed by stores and workshops, and has the main facilities of the naval base. General depths are from 16 to 26 feet with less water alongside, except on the south-western quay, which is the main coaling quay. Its length of 800 feet is made up of the east face of the coal depot, the east side of a short mole extending south at its south-east corner and a jetty extending from the mole. To its north is a rectangular basin taking up most of the west side of the cove. The south side of the basin is the north quay of the coal depot, and along it is moored a floating-dock capable of taking craft up to 240 feet in length. The north half of the basin is taken up with submarine pens formed by three concrete jetties projecting 170 feet eastwards from the western shore. They have depths of 7-17 feet alongside and are equipped with electricity, hydrants, and compressed air. The north quay of the cove is used for seaplane repairs and has a patent slip in the centre. Another slipway lies at the quay along the east shore and near the south end of this quay there is a landing jetty.

Facilities. The office of the Captain of the Port is at the south end of the quay on the west of the Cala Gavetta.

Apart from the cranes already mentioned in the islands other than the Isola della Maddalena, there are only two: one, of $1\frac{1}{2}$ tons, hand-operated, on the Banchina Via Nazionale, and one on the south side of the slip on the east of the Cala Camicia. South of the submarine pens on the west of this cove a coal transporter projects from the west shore. One floating crane and two floating sheerlegs have at times been in the port.

The main coal depot is on the rectangular quay in the south-west of the Cala Camicia and behind the quay to its north. The only bulk oil store is that belonging to Nafta on the north-east of the Isola S. Stefano (Appendix II). Ships discharge and are supplied at the two jetties on the shore below. There are hydrants on the jetties of the submarine pens.

The repair facilities are centred on the Cala Camicia. The shops can execute repairs to destroyers and submarines, and there are the two slipways and the floating-dock. The northern slipway is a patent slip about 100 feet long, while the eastern one can take craft up to 60 feet in length. Dimensions of the floating-dock are as follows: length, 232 feet; width, 33 feet; depth over blocks, 19 ft. 4 in.; lifting power, 500 tons.

There is no railway on the Isola della Maddalena, though there are Decauville tracks to the north of the Cala Camicia. All quays have

direct access to a good road which links the town along the shore to the Caprera causeway.

At Palau there is direct access from the jetty by rail and road to Tempio Pausania.

<i>Name</i>	<i>Depth alongside (feet)</i>	<i>Length (feet)</i>	<i>No. of cranes</i>	<i>Facilities, &c.</i>
<i>Isola Maddalena</i>				
Coal Depot Quay				
North side . . .	21 (dredged); shoal at western end	360	—	Berth usually occupied by float- ing dock.
East side . . .	Shoal for north- ern 330 ft.; 24 to 36 remainder	800	(?)1	—
West side of extension				
Inner berth . . .	12 at inner end; 16 at outer end	230	—	—
Outer berth . . .	12 at inner end; 33 at outer end	210	—	—
Coaling jetties				
East jetty (east side) .	9 at inner end; 23 at outer end	285	—	—
West jetty (west side) .	7 at inner end; 15 at outer end	255	—	—
Banchina di Via Nazion- ale	21	310	1	—
<i>Mainland of Sardinia</i>				
Palau	c. 13 (head and east side)	155	1 1	Ships would anchor off the quay.
Lo Stentino	10 at head (pro- bable)	80 north side; 150 south side	(?)1	Ships would anchor off the quay.

Trade and Connexions. Imports consist of manufactured goods and building materials and exports of small quantities of granite. The commercial trade is small and the prosperity of the port is bound up with the naval base.

NUORO. Latitude 40° 20' N. Longitude 9° 19' E. Population 10,820.
Provincial capital. Seat of bishopric.

Position and Site

The provincial capital of Nuoro is situated more than 1,800 feet above sea-level a few miles east of the main watershed of Sardinia. To the west of the town lies the open valley of the Nordole (Liscoi), a tributary of the F. Tirso, and to the east M. Ortobene (3,132 ft.), the watershed between two east-flowing streams which unite before reaching the gulf of Orosei. It is thus on a natural routeway across the island from the Tirso valley and east down the Cedrino valley. This route is followed by a main road (No. 129) and by the railway from

Macomer. Other local mountain roads converge at a cross-road half a mile west of the town.

The main street of Nuoro is on the east-west route, and has a network of side streets on its northern and southern sides. The cathedral and government offices are south of the main street near the east end of the town, and the railway station, town hall, police station, post office, and hospital are in the northern part of the town. Some of the public buildings are of recent construction, the main building material being granite.

History

Nuoro first appears in history in the twelfth century, when it was a village owned by the Doria family, but archaeological remains show it to have been a primitive Sard settlement. It belongs to the mountainous region of Barbagia, and is a centre for nuraghi and other characteristic features of the island civilization. In the Middle Ages it was situated at the meeting-point of the four giudicati into which Sardinia was divided, being itself subject to the Judge of Logudoro. Owing to its healthy climate, free from the curse of malaria, Nuoro grew in size and importance, and in 1779 the seat of the bishopric was transferred there from Ottana. Charles Albert, King of Sardinia, stayed there during his tour of the island in 1843, and in 1848 it was made a provincial capital. The administrative changes of 1860 deprived it of this dignity, but the division of Sardinia into the three provinces of Cagliari, Sassari, and Nuoro was revived in 1927. From that time it has grown in size and importance, and handsome modern buildings have been erected.

Industry

Nuoro is a small agricultural market in a not particularly fertile region, and its main industries are concerned with the processing of agricultural products. The main products are cheese, olive oil, and wine, although there are flour mills, a distillery, and a manufacturing confectioners.

Communications

Railway. Nuoro is the terminus of the narrow-gauge Complementary Railways line from Macomer on the State Railways main line from Cagliari to Terranova.

Roads. At Nuoro road 129 from Bosa and Macomer to Orosei is joined by a main road from Terranova in the north and another main road from Fonni and road 128.

PORTO TORRES. Latitude 40° 50' N. Longitude 8° 24' E. Population 6,438.

Position and Site

Porto Torres is near the west end of the north coast of Sardinia, on the shore of the Gulf of Asinara. The town is built near the mouth of the river Mannu, which enters the sea just west of the harbour. The hinterland is flat, making land communications easy, but the coast is open, and the harbour is, therefore, entirely artificial.

The town lies south-east of the harbour, and the streets, a few of which are wide, have a regular layout on a grid pattern. Exits by road and rail south from the town are easy, but communication westward is restricted to the old Roman bridge, as the river Mannu flows in a miniature gorge before reaching the sea.

History

Porto Torres, the ancient Turrus Libysonis, was in all probability used as a port by the Carthaginians. It became a Roman colony, of which Caesar is believed to have been the founder, and under the empire it rose to a position of considerable importance. It attained to the rank of a municipium and was the principal administrative centre and grain port of the north, as Carales was of the south. A Roman road along the west coast of Sardinia connected the two cities. Numerous monuments testify to the flourishing condition of Porto Torres in Roman times. Chief among these are the seven-arched bridge spanning the Riu Mannu, and the basilica known as Il Palazzo del Re Barbaro, which was the residence of the Roman governor in the fourth century A.D. There are also the remains of an aqueduct, a temple of Fortune, and baths. In the early Middle Ages Porto Torres was the capital of the giudicato of Logudoro, but it was gradually overshadowed by its neighbour Sassari, until it came to be regarded mainly as the port of the latter city. The basilica of S. Gavino, once the archiepiscopal church of northern Sardinia, is the grandest and best known of the medieval churches of the island. Dedicated to S. Gavino, a Roman soldier who suffered martyrdom at Porto Torres in A.D. 300, it is Byzantine in origin and was partly rebuilt by the Pisans in the eleventh century. A peculiar feature of the exterior is the absence of a façade, its place being taken by a semicircular apse at either end of the building. The twenty-eight columns of the interior are relics of Roman temples.

Description of Port

Porto Torres is the third largest commercial port of Sardinia and the port of export for Sassari, about 12 miles to the south-east, and its province. The products of the iron-ore mines of the Nurra region are also exported from Porto Torres, which has special equipment for this purpose.

Ships can anchor off Porto Torres in 10 or 11 fathoms north-eastward of the outer end of the east breakwater, but this anchorage is insecure, especially in winter, and, with winds from north-west to north-east, ships should seek shelter in one of the anchorages off Isola Asinara. Violent winds between west and north cause a heavy swell even in the inner harbour and interfere with the operation of the port. Winds between north and east, though less common, also cause a considerable swell in the harbour.

The port is small and artificial; it consists of an outer and inner harbour protected by breakwaters, with another small harbour, similarly protected, close east of these.

The outer harbour (Avamporto) has an entrance 600 feet wide, with a least depth of 36 feet, between the rocky outer ends of the west and east breakwaters. The west breakwater (Molo di Ponente) extends northward, and then north-eastward, from a point on the eastern side of a small bay at the mouth of the Riu Mannu, and has a total length of about 800 yards. Its inner side is quayed, being about 30 feet wide and 10 feet above high water and having a depth alongside of less than 16 feet for most of its length; there is from 21 feet to 32 feet of water at a distance of about 30 feet from the quayside, except off the southern half of the north-south part of the breakwater.

The east breakwater (Molo di Levante) extends north-eastward and then north-westward, and has a total length of nearly half a mile; it is about 4 feet above high water at its outer end. The north-western side of its inner end is quayed for about 300 feet; this quay and the north-eastern side of Pontile del Faro, which projects from the root of the east breakwater, are the only cargo-handling quays in the outer harbour.

Depths in that part of the outer harbour northward of a line joining the bends in the two breakwaters are from $3\frac{1}{2}$ to $6\frac{1}{2}$ fathoms over an area of about 100,000 square yards. South of this line depths decrease, except off the entrance to the inner harbour.

The inner harbour (Porto) is entered between the north-east end of Molo Teleferica and the north-west end of Pontile del Faro; the entrance is about 250 feet wide, with a depth of from 20 feet to 23

feet except within 30 feet of the entrance-points, where there is shoal water. The inner harbour measures about 240 yards by 220 yards, and has depths of from 20 feet to 24 feet except within 50 feet of the quayside. The Molo Teleferica extends north-north-east from the south shore almost midway between the roots of the east and west breakwaters, but only the inner part of the inner side is quayed and is used principally for the export of iron ore. The Pontile del Faro is the main quay for general cargo, whilst the south-eastern side of the harbour is formed by the Customs Quay.

The east harbour (Darsena) lies between the east breakwater and a rocky point 280 yards south-eastward of it, and is partially protected from the north-east by a small breakwater projecting from the east breakwater. The inner side of this small breakwater is quayed, as is a short stretch of the south-east side of the east breakwater, but these quays are not used for discharging cargo. Depths in the east harbour are generally shoal, and are nowhere greater than 11 feet. From the centre of the south-west side of the east harbour a rocky reef projects north-eastward for about 100 yards; to the north-west and south-east of this reef there are sandy beaches. Weed is liable to accumulate in the east harbour.

<i>Name</i>	<i>Depth alongside (feet)</i>	<i>Length (feet)</i>	<i>No. of cranes</i>	<i>Facilities, &c.</i>
Molo Teleferica . . .	21	510	1	Electric ore-transporter and gantry. Railway and mineral line. Shoal patches alongside, with a least depth of 3 ft.; clear at 30 ft. from quayside.
South-west side of Inner Harbour . . .	3 to 7 (20 at 65 ft. from quay)	450	..	Slipway, 160 ft. wide, divides quay into two; there are 140 ft. of quayage NW. of slipway and 310 ft. SE. of it.
Customs Quay . . .	18 to 21	620	1	Single-track railway. Customs-house at SW. end of quay. Shoal patches close alongside quay; clear at 30 ft. from quayside. Ships of over 15-ft. draught should employ catamarans.
Pontile del Faro . . .	..	..	..	Single track railway. A few shoal patches close alongside SW. side of mole; clear at 30 ft. from quayside. Ships of over 15-ft. draught should employ catamarans.
SW. side . . .	18 to 24	500	..	..
Outer end . . .	8	200	..	..
NE. side . . .	16	530	..	..
East Breakwater NW. side of base .	8	310	..	Single track railway.
East Harbour NW. corner . . .	6 to 8	640	..	East Harbour used normally only by fishing craft.

Facilities. The offices of the harbour-master are at the root of the east breakwater, and the customs-house is at the south-western end of the Customs Quay.

Discharge of cargo is normally carried out alongside Pontile del Faro or the Customs Quay; both of these are rail-served, and the latter has one $1\frac{1}{2}$ -ton crane. All the main quays have shoal patches close alongside, and it is probable that only ships drawing 15 feet or less can berth alongside without catamarans. The customs-house contains a warehouse, and other sheds are on the Molo Teleferica and Customs Quay. There is no bulk storage of oil, but normally a stock of 150 tons of coal was maintained. The inner harbour is equipped with hydrants.

There are two small slipways, to take ships of up to 80 tons, on the south-west side of the inner harbour. Only minor repairs to small craft can be carried out.

Industry

Porto Torres is not an industrial centre, but is the port of export for iron ore from the Nurra.

Inland Communications

Railways. Porto Torres is the terminus of the State Railway standard gauge branch from Chilivani on the main line from Terranova to Cagliari. Narrow-gauge mineral lines link Porto Torres with the iron-ore mines of the Nurra.

Roads. Porto Torres is served by road 131 from Sassari and also by secondary roads from Stintino and Miniere dell' Argentiera.

SASSARI. Altitude 738 feet. Latitude $40^{\circ} 44'$ N. Longitude $8^{\circ} 35'$ E. Population 44,130. Provincial capital. Seat of archbishopric. University. Chamber of Commerce.

Position and Site

Sassari stands on a plateau near the centre of the Sassari tableland where the main roads from Porto Torres to Cagliari and from Alghero to Terranova intersect.

The plateau on which the city stands slopes down westwards towards the station (597 ft.) from the foot (738 ft.) of the steep slope of a hill to the east, and ends on the north at the narrow Valle del Rossello. The main and oldest part of Sassari covers the northern

end of the plateau and until the nineteenth century was enclosed by medieval walls. The compact and irregular layout distinguishes this part of the city from the rectilinear streets of the newer parts which spread south-east (780 ft.) and south-west (650 ft.). The main commercial thoroughfares are the Corso Vittorio Emanuele II and the Via La Marmora which cut through the old part of the city from north-west to south-east. Newer parts of the city extend also over the slopes of the Colle dei Capuccini on the west (from about 740 to 830 ft.) and to the north of the city beyond the Valle del Rossello, which is crossed by a modern road viaduct.

History

Sassari is medieval in origin. It grew up as a city of refuge for the inhabitants of the neighbouring coastal districts, harassed by Saracen raids. Situated at a focal point between the ports of Alghero, Porto Torres, and Castel Sardo, it became the centre of commerce between them and the rural districts of Logudoro and Gallura. It was frequented by Pisan and Genoese merchants and, in the thirteenth century, became the capital of the giudicato of Logudoro in place of the far older Porto Torres. Inspired by Italian ideals of civic liberty, the citizens were restive under monarchical rule, and in 1236 they rose against Barisone III of Logudoro, who was killed in the struggle. His sister Adelasia was married to Ubaldo Visconti of Gallura, but Sassari refused to recognize the claims of the latter to the giudicato, and proclaimed itself a free commune. By 1278 it had a population of some 10,000. During the greater part of the thirteenth century Pisan influence predominated and the citizens received their Podestà from Pisa. After the Pisan defeat at Meloria (1284), however, the ascendancy passed to Genoa, and in 1294 the citizens gave an undertaking that 'all Pisans shall be expelled from the town of Sassari without hope of return'. The same year saw the promulgation of the Statutes of the Commune, framed on Italian models. During the fourteenth century Sassari engaged in a struggle to maintain its liberty against rival lords. On the coming of the Aragonese it used the new rulers of Sardinia to emancipate itself from the control of Genoa and the Doria family. Finding the Aragonese yoke heavy it rebelled, and when the revolt was suppressed the Aragonese built a castle to hold down the city, and colonized it with Catalans. In 1369 it was occupied by Mariano of Arborea, and thus became identified with the movement for national independence against foreign conquerors. It was only tardily and reluctantly that it submitted to Alfonso V of Aragon when

he came in person to Sardinia in 1420. The ideals of the French Revolution were eagerly accepted in Sassari, and led to a revolt against the feudal nobility and the expulsion of Piedmontese officials. Gian Maria Angioi, who was sent by the Viceroy to pacify the city, received an enthusiastic welcome, but on his flight the movement collapsed, and Sassari had to await the reforms of Charles Albert for the removal of the feudal yoke. True to the traditions of liberty, volunteers from Sassari took part in the war of Italian liberation, and the fighting spirit of the citizens was again shown in the distinction won on the Carso and in the Trentino by the Sassari brigade during the War of 1915-1918.

The cathedral of S. Nicola is a much restored Romanesque building with a fine baroque façade. The seat of the archbishopric was transferred from Porto Torres to Sassari with papal sanction in 1441. The University of Sassari grew up under Jesuit influence and received its charter in 1617; it has to-day some 200 students. The Museo Archeologico contains an important collection of Roman remains from Porto Torres.

Industry

Sassari is primarily an agricultural market, and most of the town's industries are concerned with the processing of agricultural products. The tanning of local hides and the production of fancy leather goods are ancient industries, whilst the making of cheese and the production of olive oil are notable traditionally. There are also distilleries, brick and tile works, flour mills, pasta, soap and candle factories. Other locally produced goods include wine, tobacco, wool, cork, and wax. Mines near by yield silver, lead (galena and carbonate of lead), and raw calamite and blende.

Communications

Railways. Sassari is served by the State Railways standard-gauge branch from Porto Torres to Chilivani on the main line from Terranova to Cagliari, and by the narrow-gauge lines of the Complementary Railways to Alghero and Sorso, and of the Sardinian Railway to Tempio Pausania, the junction for Palau-Marina and Monti, also on the Terranova-Cagliari line.

Roads. Road 131 from Cagliari, road 127-bis from Alghero, a secondary road from Miniere dell' Argentiera, road 131 from Porto Torres, another secondary road from Castel Sardo, and road 127 from Terranova all meet at Sassari.

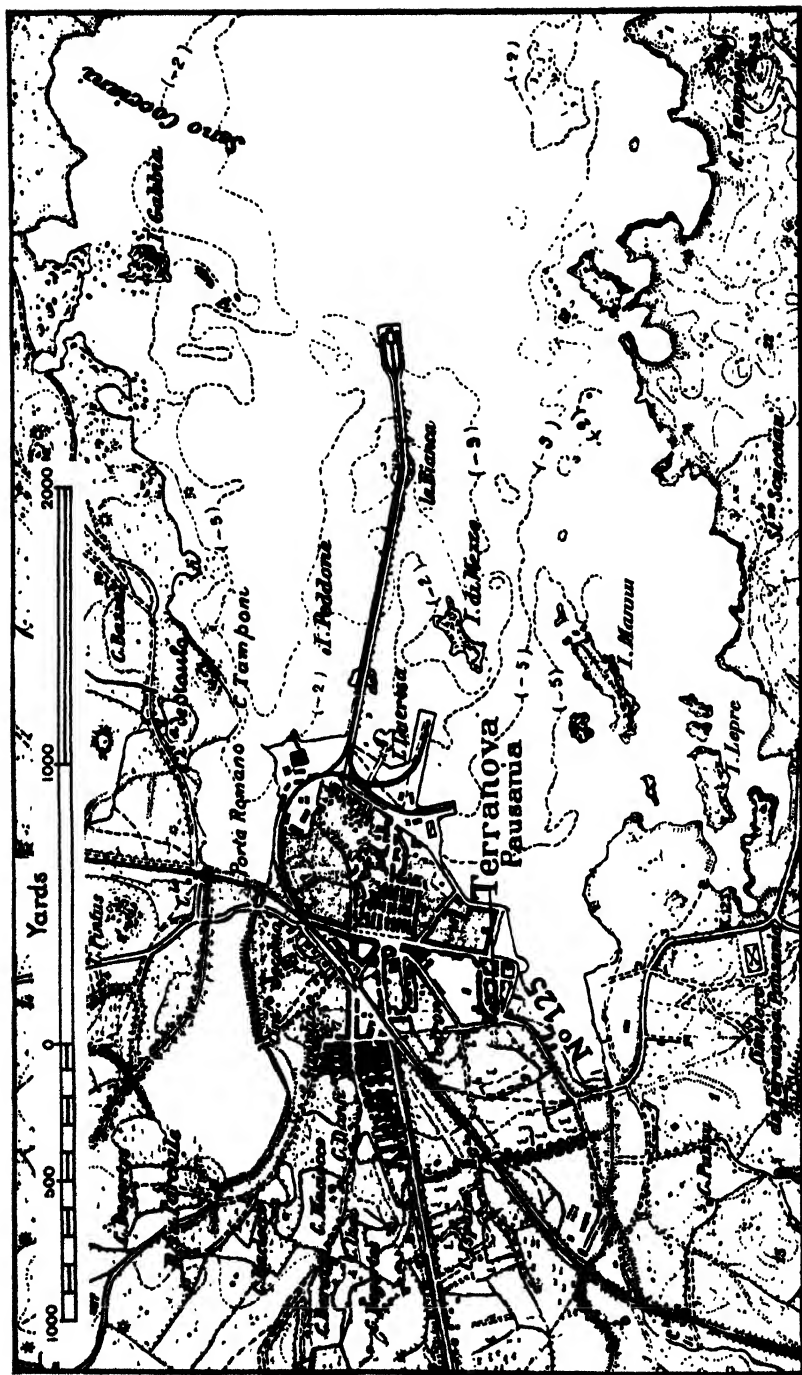


FIG. 54. Terranova Pausania

TERRANOVA PAUSANIA (Olbia). Latitude $40^{\circ} 55' N$. Longitude $9^{\circ} 30' E$. Population 7,799.

Position and Site (Fig. 54)

The small town of Terranova is at the head of the gulf of Terranova (or Olbia), in low marshy country through which several small streams enter the harbour. The nearest hills are several miles away to the north, west, and south. The town is built on a small peninsula between the mouths of two streams, and its layout is determined by the main roads which meet here: the north to south road which approximately follows the east coast of Sardinia and the road running west to Tempio Pausania. These roads meet near the chief square, the Piazza Regina Margherita, not far from the railway station.

History

Terranova Pausania was the ancient Olbia, a colony traditionally founded by the Greeks which later fell to the Carthaginians. Under the Romans it became a place of some importance, the starting-point of two roads and a centre for the export of silver. It had its own bishop as early as the days of Gregory the Great (590–604). After the defeat of the Saracens in 1016 the inhabitants began to return from the mountains whither they had fled before the raiders, and the city became flourishing. Guarded by the two neighbouring forts of Pedres and Telti, it was one of the principal strongholds of the giudicato of Gallura, and under the Visconti judges the commune was organized on the Pisan model. In 1324 the Aragonese admiral, Carroz, laid siege to Terranova, but was forced to retire on the arrival of a large Pisan fleet. It long maintained its independence of the Aragonese kings and became part of the dominions of the house of Arborea, the last native judges of Sardinia. In the fifteenth century it was granted as a fief to the Carroz family. It took part in the anti-feudal rising under Angioi in the eighteenth century and sent a band of volunteers to fight the Austrians in 1848. Its population in 1881 was under 4,000, but the institution of a daily service of steamers from Civitavecchia to Terranova, making it the principal link between Italy and Sardinia, has added greatly to its size and importance. The granite church of S. Simpliciano is an old and interesting building, many classical fragments having been used in its construction.

Description of Port

The harbour, which consists of a narrow inlet, about 3 miles long from east to west, at the head of the gulf of Terranova is approached between Point Figlio, on the north side of the entrance, and Point Saline, on the south side; on either side of the entrance and of the fairway within it are shoals and rocks. The entrance-channel is about 140 yards wide and has a least depth of 23 feet.

Ships too large to enter the harbour can obtain temporary anchorage about 1 mile eastward of Point Figlio in depths of from 8 to 11 fathoms, or about $2\frac{1}{2}$ cables eastward of Point Figlio in a depth of about 36 feet. During off-shore winds small ships can anchor in Liscia delle Saline, on the south side of the harbour entrance, in depths of from 19 to 30 feet. Ships which enter the harbour can obtain secure anchorage, in depths of from 21 to 27 feet, south-westward of Point Ginepro on the northern side of the harbour. Ships drawing less than 15 feet can obtain anchorage in the approach to Porto Romano. The harbour is completely sheltered.

Within the harbour entrance the north coast is sloping and foul, with a few small sandy beaches; at the western end of the harbour it is low, marshy, and unhealthy. The shallow water along the north coast is used for mussel-culture, with stakes and netting partially above water. The south coast is also low and marshy, with the delta of F. Padrogiano at its eastern end. There are mussel-beds between the island of Manna and the delta.

The town and quays are situated at the head of the harbour, which is much obstructed by islets, shoals, and rocks. From the town a causeway extends eastward into the harbour for about three-quarters of a mile, with an area of reclaimed ground at its root. This causeway is constructed across shoal ground connecting the Isola Fiorita and the Isola Bianca with the shore, and is about 40 feet wide; it carries a road, and on its northern side a railway. Near its head the causeway broadens and forms a mole, on which is situated the railway station of Terranova Marittima (Stazione Marittima), formed by two large sheds. The mole, which is quayed at its head for 435 feet on its north and south sides and for 130 feet at its east end, is normally reserved for the use of mail-boats. The least depth in the fairway, between the harbour entrance and the mole head, was 21 feet in 1939, but there were patches with depths of 19 feet close on either side of it.

The part of the harbour north of the causeway has a seaplane station at its western end, on the south side of the old Roman harbour

(Porto Romano). This part of the harbour is approached across a bar extending northward from near the head of the causeway; the least depth in the fairway across the bar is 15 feet. Porto Romano itself is shallow, but between it and the bar there are depths of from 16 to 24 feet.

The western shore of Porto Romano is formed by an embankment carrying the railway northward to Golfo Aranci; inland of the embankment is a landing-ground. The eastern part of the southern shore, and the shore extending southward to the root of the causeway, is quayed, and forms the seaplane station. The station is equipped with a slipway and crane in front of a large hangar on its eastern quay, between Porto Romano and the root of the causeway; there also appears to be a small slipway west of a landing-place at the south-east corner of Porto Romano.

The inner harbour (Porto Interno) lies on the southern side of the causeway; it is approached from the outer harbour by a narrow and tortuous fairway, which should not be used by ships drawing more than 16 feet. It consists of two moles, the Molo Capitaneria and Banchina Vecchia, extending respectively south-eastward and southward from the shore. Between the root of the causeway and the Molo Capitaneria there is a small islet (Isolotto Lucrea), connected to the shore by a small causeway or bridge; the islet has a landing-place for boats in shallow water on its south-eastern side.

The Molo Capitaneria is about 640 feet long on its northern side, 180 feet wide, and 950 feet long on its southern side; it is quayed on its three sides, and served by a rail track on its southern side. The northern side is shallow alongside, with depths of from 5 to 11 feet, but there are depths of about 20 feet alongside the southern side. Its east end has a depth of 14 feet.

The Banchina Vecchia, south of the Molo Capitaneria, is about 400 feet long on its eastern side, 175 feet on its western side, and 80 feet wide. This mole is equipped with railway tracks, between which is a metal-roofed shed. It is quayed on its three sides, and has a depth of about 18 feet on its eastern side; the depths on the western side are from 13 to 15 feet. Adjoining the Banchina Vecchia to the westward is a short length of rough quay used by small craft.

About half a mile to the westward of the above quay is the entrance to a small canalized creek crossed by the Mannu bridge, carrying a road leading eastwards from the town. On the south side of the creek, east of the bridge, the bank is formed by a sea-wall with some lime-

kilns and the abattoir near by. There is a small landing-place, with a depth of 6 feet or less, east of the lime-kilns.

Facilities. The Captain of the Port's office is at the root of the Molo Capitaneria and the customs-house at the root of the Banchina Vecchia. Each of the three main quays have warehouses, but discharging is by ship's appliances alongside the quays or into lighters from ships at anchor. A stock of about 150 tons of coal is normally maintained, but there is no bulk storage of oil. The Stazione Marittima and the Banchina Vecchia are both equipped with hydrants. Repair facilities are limited to the seaplane base.

Industry

Terranova is the second commercial port of Sardinia and handles the bulk of the mail and passenger traffic with Italy. Its industries are unimportant, but there are some lime-kilns, yards for the manufacture of concrete building materials, small engineering establishments, and workshops for the production of granulated cork. The country round the port is not very fertile, though corn, cork, cheese, and cattle from a wide region are exported.

Inland Communications

Railways. The main State Railways line from the Terranova Marittima station to Cagliari is joined at the town station by the branch from Golfo Aranci.

Roads. Terranova is served by road 125 along the east coast to Cagliari, and by road 127 to Sassari. At Telti on the latter road other main roads diverge to Macomer and Nuoro. Secondary roads also lead to Golfo Aranci and Palau.

ROADS

THE roads in Sardinia have to serve a comparatively small population, living mainly in large villages. The network, therefore, nowhere reaches a closeness comparable with that in the Northern Plain or Tuscany on the mainland, and except for the neighbourhood of Sassari, the Campidano, southern Arborea, and Trexenta, is very loose. The state roads and a few other main roads are adequate in themselves, and the supplementary second-class and minor roads are few except in the area already mentioned. The whole of the north-east (Gallura, Budduso-Ala, and Bitti-Nule plateaux), the Nurra, southern Gerrei and Sarrabus, and the Iglesiente highlands (apart

from the actual mining districts) have few roads other than the main roads, which pass through all the important villages (Pocket map).

Most roads follow distinct features of the relief (Appendix IV). Coastal stretches, common on the mainland, are rare and are confined among the main roads to the road immediately south-west from Cagliari. The coast has many cliffs, and but few towns or villages for the most part, although there are a number of towns within a few miles of the sea. There is a state road (125) which roughly follows the east coast, but at a distance of about 3 or 4 miles from the sea, and often separated from it by coastal hills and headlands. Similarly a road follows the south-west shore. Otherwise the roads follow valleys and plains. Ridge roads are not common, neither are the unstable rocks which give rise to them. The principal natural features made use of by main roads are the plain of the Campidano leading north from Cagliari, the Terranova-Ozieri depression leading south-west from Terranova, the two valleys (Liscai-Nuradole and Cedrino) which almost sever the eastern highlands near Nuoro, the Cixerri valley leading west out of the Campidano, the flat, open plateaux near Macomer, and a number of smaller valleys and plains. The principal obstacles are the eastern highlands, especially where, as in Barbagia, they are deeply trenched by gorges, and also the Macomer scarp, Marghine chain, and Budduso-Ala plateau, which are all interconnected and form a continuous barrier across the island, with gaps only at Macomer and Pattada.

The network of main roads consists of four main south-to-north and four main west-to-east routes. The two westernmost of the south-to-north roads have a common section near Oristano. The west coast road (including road 126) only approaches the coast at one place (the foot of M. Ferru) between its termini, and uses a large number of small coastal plains and river valleys. The principal road from Cagliari to Sassari (131) follows the eastern edge of the Campidano, crosses the Abbasanta plateau, negotiates the Campeda scarp by the notch at Macomer, and proceeds through small plains and valleys to Sassari; the only large natural obstacle is the deep valley of the R. Mascara close to Sassari itself. The central road (128) from Cagliari to Terranova via Nuoro or Ozieri is a mountain road following a series of valleys; it keeps on the whole to the western edge of the high plateaux of Barbagia, and thenceforward to the foot of the Marghine scarp or alternatively to the tops of the level granite plateaux to the north of Fonni. The east coast road (125) from Mura-vera to Terranova has already been mentioned.

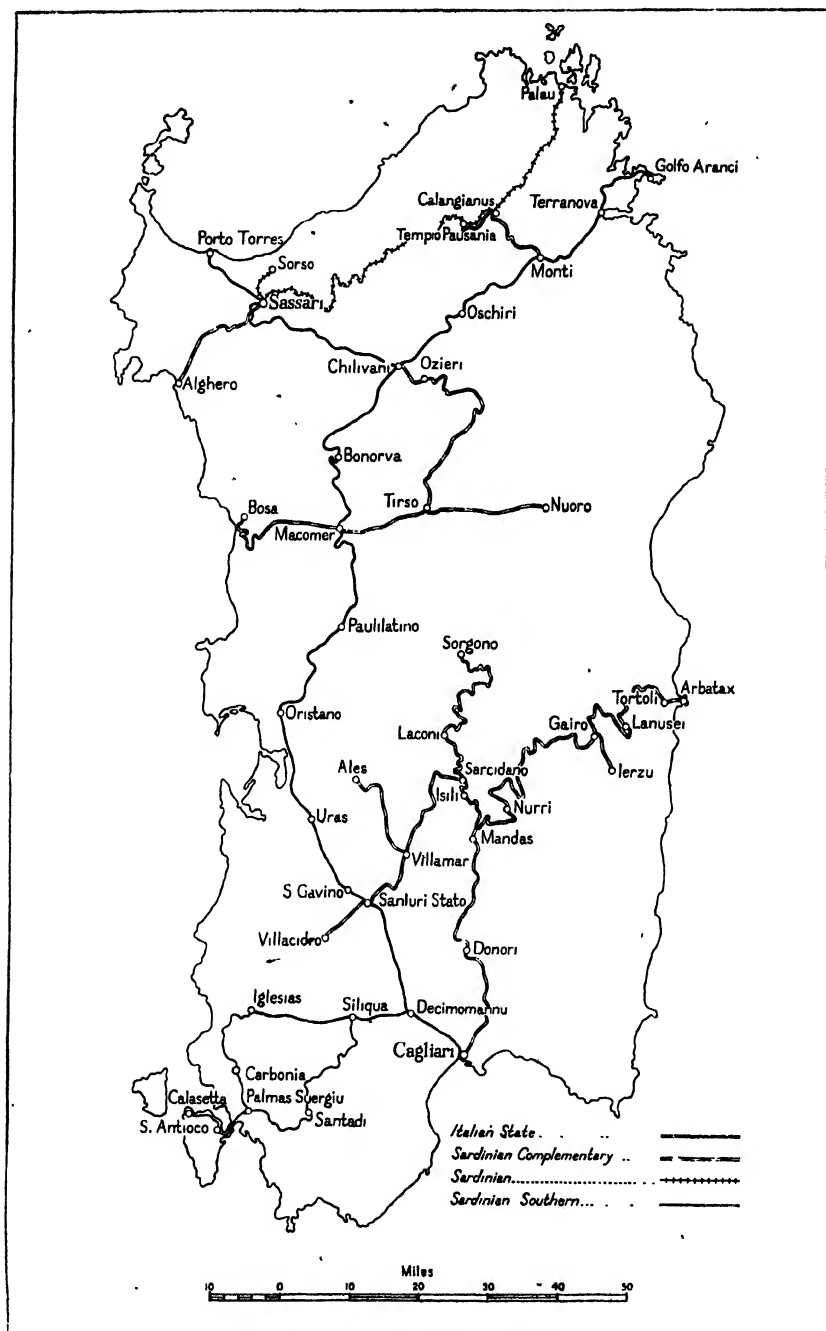


FIG. 55. Railways of Sardinia

Of the west-to-east roads the southernmost from Inglesias to Muravera (130, 125) uses the Cixerri valley and the Campidano, and crosses Sarrabus by two deep convenient valleys. The Bosa to Orosei road (129) uses the Campeda plateau, the Macomer gap, and the Liscoi (Nordole) and Cedrino valleys through Nuoro. The road from Alghero via Ozieri to Terranova (including 127, 131-*bis*, 128-*bis*) uses the small plains of Logudoro and the Ozieri-Terranova depression; while the northernmost road from Porto Torres to Tempio Pausania and Terranova (131, 127) is a hilly road passing from the Nurra plain, over the hills of Anglona and across the Coghinas valley to the mountains of Gallura. There is a fifth main road crossing the eastern highlands from near Mandas to Tortoli, but this is one of the most tortuous and difficult of them all and has no continuation westward to Oristano. The principal road foci in Sardinia are the two largest towns, Cagliari and Sassari, and the gap towns of Macomer and Nuoro.

The progress of road improvement by the Azienda autonomo statale della Strada (III, pp. 381 and 534) has been slow in Sardinia, and only 232 miles out of 894 miles of state roads had been resurfaced by 1939. The highlands often present considerable engineering difficulties, which on the main road have been reasonably well overcome. The minor roads are often narrow and surfaced with loose metal, but used by regular bus lines. In 1938 buses operated 3,875 route miles and carried 1,967,000 passengers (III, p. 534). There were no purely urban bus services. Motor vehicles (8,400) in general were fewer than in any other compartment except Lucania (III, p. 535). The density of traffic on the roads was accordingly very light except in the immediate vicinity of Cagliari.

RAILWAYS

Organization

The early development of railways in Sardinia has been discussed in Volume III. Since 1922 the main lines of the island have formed the Cagliari division of the Italian State Railways. In addition to these standard-gauge lines there are the narrow-gauge (0.95 m.; 3 ft. 1½ in.) lines of three private companies. All Sardinian railways are single track.

The territory served by the various systems is shown in Fig. 55; the length of line owned by each company is as follows.

<i>Standard gauge.</i>	<i>Miles</i>	<i>Km.</i>
<i>Ferrovie dello Stato</i> , Cagliari division	257½	414
<i>Narrow gauge</i>		
Complementary Railways (<i>Ferrovie Complementari</i>)	432½	696
Sardinian Railway Company (<i>Soc. Strade Ferrate Sarde</i>)	87½	141
Southern Railways (<i>Ferrovie Meridionali</i>)	70½	114
Total narrow gauge	<u>590½</u>	<u>951</u>

In addition to the above, there are several private narrow-gauge mineral lines:

	<i>Approximate length</i>
Porto Vesme-Monteponi (S.A. di Monteponi)	13 miles
La Maddalena-Pauceris and S. Leone	13 "
Porto Botte-Pantaleo	17 "
Buggeru-Malfidano	1 "
Gennamare and Ingurtosu-Naracauli	7 "
Montevecchio-S. Gavino Monreale	13 "
Porto Torres-Nuragaddu	3 "
Porto Torres-M. Rosso	13 "

Further details of these mineral lines are given in the accounts of mining industries and ports.

The divisional management responsible for the State Railways in Sardinia has its headquarters at Cagliari. The headquarters of the *Ferrovie Complementari* are also at Cagliari, while those of the *Società Strade Ferrate* are at Sassari, and those of the *Ferrovie Meridionali* at Iglesias.

Equipment and Rolling-stock

On standard-gauge lines the rails are of flat-bottomed type and are of medium weight, being either of Class II or Class III (III, p. 410). Gradients of up to 1 in 50 and even steeper occur frequently on the State lines, but gradients of up to 1 in 37 are not uncommon on the narrow-gauge lines.

The signalling system and safety regulations have already been discussed (III, p. 611). As on the mainland, level crossings are frequent, there being, for example, about 42 on the main line from Terranova to Cagliari. The loading gauge is the standard for the State Railways (III, p. 410).

No separate statistics are available of the locomotives and rolling-stock of Sardinia, but the State Railways stock includes railcars of standard type (III, p. 419), and recent steam locomotives (III, p. 416), rendered redundant on the mainland through electrification.

Permanent-way restrictions, however, preclude the use of the heaviest Italian State steam locomotives since light axle-loads are necessary, and 2-6-0 locomotives of the former Royal Sardinian Company are still common. The narrow-gauge lines are in many respects similar to the better known Corsican railway system. Among the narrow-gauge locomotives are a 2-6-2 tank type, with 15 by 19 $\frac{3}{4}$ inch cylinders and 3 ft. 3 in. coupled wheels, which acts as a mixed traffic engine, and a 2-8-0 tank type, which is used on lines such as the Sorgono branch with long, steep gradients. In the latter, the boiler is inclined downwards to the smoke box and the coupled wheels and axles are articulated on the Klien-Lindner system. Railcars are much used for passenger traffic on both the State and private railways. The ordinary rolling-stock of the main lines is of the standard Italian State Railway type, although some of the old Royal Sardinian coaches include vehicles with Cleminson Radial trucks.

The transport of passengers by trams is little developed in Sardinia, the only tramways for passengers as distinct from minerals being in the Mussolinia district and in the suburbs of Cagliari town. These tramways follow the main roads and have no separate trackway.

Traffic

On the standard-gauge lines in 1936-7, the total steam-train mileage was 703,750, of which 230,625 miles were run by goods trains and 473,000 by passenger trains. In addition 868,750 miles were run by railcars. During 1939 the daily service on the standard-gauge lines amounted 8-10 passenger trains each way daily, and on the narrow-gauge to 1-4 each way, except on those from Sassari to Alghero (6 trains), Macomer to Nuoro (5 trains), and Iglesias to Palmas Suergiu (9 trains). The fastest average speeds on the standard-gauge lines are about 30 m.p.h.; the slower trains usually average well under 25 m.p.h. In June 1940 the best service on the Terranova-Cagliari route was afforded by a diesel railcar with restaurant facilities, and first- and second-class accommodation only; it took 4 hours 20 minutes for the 178 miles, including stops at nine main stations.

On the State Railway lines the loading facilities at most of the main termini consist of end- and side-loading ramps and cranes; at other chief stations there are side-loading ramps only.

The Railway Network

Considering its mountainous nature and sparse population Sardinia is well provided with railway communications. The restricting in-

fluence of the relief is seen in the way the railways wind tortuously along mountain valleys and in the circuitous nature of the lines as a whole. The effect of relief has been further emphasized by the fact that when the layout of the lines was originally planned, wide detours and hairpin bends were often preferred to the building of expensive tunnels and bridges. Probably the outstanding feature of the network is the complete absence of coastal routes, the overland connexions in these areas being supplied by state roads. Public railways go to the coast at Terranova, Golfo Aranci, Palau, Porto Torres, Alghero, Bosa, Calasetta, S. Antioco, Cagliari, and Arbatax, but apart from these ten points the lines keep well inland. The whole of the eastern highlands of Sardinia south of Terranova and east of a line from Oschiri to Nuoro and Cagliari has no railway except the one difficult transverse route from Arbatax to Mandas.

The present network consists essentially of a north-south standard-gauge state line which, together with its two branch lines, gives connexion at eight points with various narrow-gauge lines. In the following account the main trunk-line is described separately, while its two branch lines and the public narrow-gauge lines are discussed regionally. The gradients given in the accounts are based on the relation of the altitude of the stations to the route mileage; consequently they merely indicate that gradients at least as steep as the figure given are likely to occur on the stretches of line in question.

Terranova-Cagliari. The main line of the Cagliari Division of Italian State Railways runs from Terranova to Cagliari and is built on the standard gauge. A branch 1.8 miles long connects Terranova town with the port, whither passengers and freight are brought by steamer from Civitavecchia on the Italian mainland, and another branch runs north-eastward to Golfo Aranci (13½ miles). South-westward of Terranova the main line crosses a low watershed into a valley, or structural depression, drained by the R. Padrogiano, which is followed almost to the hills at its source. Here, after an ascent (average 1:55) and a short tunnel, the watershed is crossed to Monti (16¼ miles; 951 ft.), the junction of the Complementary Railways narrow-gauge line traversing hilly country (ruling gradient about 1:37) to Calangianus (16¾ miles; 1,588 ft.), and Tempio Pausania (24¾ miles). Beyond Monti the route proceeds down the upper valley of the Coghinas which drains the well-defined depression almost separating the undulating granite country of Gallura from the remainder of the eastern massif of Sardinia. The Coghinas and its tributary valleys are followed to Chilivani (45½ miles; 738 ft.), where a standard-

gauge line comes in from Porto Torres and a narrow-gauge line from Bono and Tirso. South of Chilivani the State line ascends the valley of the R. Mannu and between Giave ($62\frac{3}{4}$ miles; 1,388 ft.) and Bonorva (67 miles; 1,486 ft.) crosses the hilly, volcanic country. Here it surmounts, with the aid of wide curves and of one long and two short tunnels, the main watershed of north-western Sardinia, the summit height of 2,067 feet being reached near Campeda ($77\frac{3}{4}$ miles). From Campeda the line descends gently over a basalt plateau to Macomer (83 miles; 1,873 ft.), the junction of narrow-gauge lines to Nuoro and Bosa. Southward the main railway continues to descend with an average gradient of 1 in 50 as far as Borore (89 miles; 1,293 ft.) and of 1 in 112 thence to Milis station (108 miles; 564 ft.). In this section the towns, such as Milis and Paulilatino, are built on high rocky hills at a distance of several miles from their stations. Beyond Milis station, where the basalt plateau is left for the flat alluvial soils of the Campidano, there is a fairly steep descent (average 1 in 56) to Solarussa ($113\frac{3}{4}$ miles; 39 ft.) which lies in the valley of the Tirso. After bridging this river the railway proceeds eastward to Oristano (120 miles; 138 ft.) and then turns southward past the edge of extensive marshes and salt-lagoons. An easy direct traverse of agricultural land precedes the low watershed of the Campidano which is crossed at about 200 feet near Sanluri (151 miles). Thence, after skirting the edge of a reclaimed area, the line follows the bank of the F. Mannu (4 bridges) as far as the wide salt-lagoon at its mouth. The approach to Cagliari (178 miles) lies for 6 miles along the eastern shore of this lagoon.

Northern Sardinia. Apart from the Terranova-Milis section of the main line described above, northern Sardinia is served by a standard-gauge branch line from Chilivani to Sassari and Porto Torres, and by narrow-gauge railways from Sassari to Alghero, Sorso, and Tempio Pausania (the junction for Palau Marina and Monti) and from Bosa to Macomer and Nuoro.

The standard-gauge State line from Chilivani to Porto Torres has a maximum gradient of about 1 in 50 and few notable constructional works except three short tunnels and several bridges. From Chilivani the railway trends north-westward over flat marshy alluvial country and bridges the rivers Badde Diannesu and Sadde before winding uphill at a gradient of 1 in 95 to Ploaghe ($12\frac{1}{2}$ miles; 1,106 ft.). Thence a fairly steep descent (1 in 50) through volcanic country leads to Campomela ($18\frac{1}{4}$ miles; 525 ft.). A few miles north-west of Campomela the railway enters the valley of the R. Mascari and winds

downhill along it at a gradient of 1 in 70 as far as Tissi-Usini (24½ miles; 236 ft.). Near this station the line turns northward away from the R. Mascari and climbs with a gradient of 1 in 70 to Sassari (29½ miles; 558 ft.), the main railway junction of north-western Sardinia. Beyond Sassari the railway descends on an average gradient of 1 in 57 to S. Orsola (31½ miles; 604 ft.) and of 1 in 50 thence to S. Giovanni (33 miles; 30 ft.). West of S. Giovanni the valley of the R. d'Ottava is followed amid undulating, scrub-covered country most of the way to Porto Torres (42 miles). The harbour at Porto Torres is connected with the mines of the Nurra by a private mineral railway (p. 640).

The narrow-gauge line from Alghero to Sassari (21½ miles) is worked by the Sardinian Complementary Railways. It winds over a low volcanic plateau and bridges several streams, including the R. Serra, R. de Cabria, and R. Mannu di Torres. The ruling gradient is only 1 in 140 as far as the bridge over the R. Mannu near S. Giorgio (15 miles; 166 ft.), but east of this town the line ascends the valley of the R. Mascari for 3 miles and then, at Mulafa (18 miles; 272 ft.), turns north and climbs on an average gradient of about 1 in 65 to Sassari, where it connects with the Sardinian Railway company's system. This consists of a branch line from Sassari to Sorso (6½ miles; 436 ft.) and of a main line to Palau Marina. The latter, on leaving Sassari, makes a circuitous ascent, with gradients of between 1 in 70 and 1 in 80, of the edge of the volcanic plateau. The top of the plateau is reached near Fenosu (37½ miles; 1,755 ft.), beyond which a steady descent (average 1 in 110) leads to Nulvi (43½ miles; 1,519 ft.). East of this station the valleys of the headstreams of the R. Altana provide a circuitous route downhill, with an average gradient of 1 in 50, to Martis (49½ miles; 837 ft.), whence the Altana valley is followed to its confluence with the master-stream, the Coghinas. Having bridged this river, the route enters upon the outskirts of the granitic plateau of Gallura. Between Coghinas (60½ miles; 138 ft.) and Tempio Pausania (78½ miles; 1,798 ft.) the climb to the plateau is accomplished with the aid of five short tunnels, several sharp bends, and of a continuous gradient, which steepens to an average of 1 in 42 between Bortiadass (72 miles; 1,096 ft.) and Aggius (75½ miles; 1,568 ft.). Throughout this section the railway keeps close to main road 127. Beyond Tempio Pausania the route continues over undulating granite hills, and bridges the R. Carana on the way to Luras (85 miles; 1,503 ft.). Here the line turns north-eastward and falls with gradients of up to 1 in 44 past Calangianus to S. Linaldo (90½ miles; 846 ft.). A general descent, with a short interruption near Sant' Antonio

(96½ miles; 725 ft.), precedes Arsachena (106¾ miles; 285 ft.), where the line turns northwards and follows the valley of the R. Surrau most of the way to the coast at Palau Marina (114¾ miles).

The other west-east narrow-gauge line serving northern Sardinia runs from Bosa to Nuoro and belongs to the Sardinian Complementary Railways. Except for the first 16 miles of its course, the railway never diverges far from the main Bosa-Nuoro road (129). From the terminus on the south bank of the F. Temo opposite Bosa town, the line runs west to the coast at Bosa Marina and turns southward along a narrow coastal plain before making a circuitous ascent, with an average gradient of 1 in 46, to Tresnuraghes (12½ miles; 873 ft.) and Suni (15 miles; 1,073 ft.). Here the route turns eastward over the basalt plateau, and ascends steadily to Bara (26 miles; 2,090 ft.) whence a gradual descent, including a passage under the viaduct carrying the Terranova-Cagliari State railway, leads to the junction at Macomer (30½ miles; 1,873 ft.). East of Macomer the line to Nuoro continues to descend and has an average gradient of 1 in 51 as far as Lei (41 miles; 1,119 ft.). Since this section lies along the foot of basalt mountains which drain southwards to the wide alluvial valley of the Tirso, the railway crosses the Manigos, Bidiena, Canales, Ena de Sa Pira, and several smaller streams. Then, just beyond Tirso junction (47½ miles; 712 ft.) a winding descent precedes a bridge over the upper Tirso. Beyond this bridge the railway ascends, with an average gradient of 1 in 62, the valley of the river su Orto, which is bridged 4 times in the next 6 miles. Eastward a low watershed gives access to the valley of the F. Nordole (Liscoi) which is followed amid rolling granite country for most of the way to Prato Sardo (66 miles; 595 ft.), whence a winding incline at 1 in 100 leads up to Nuoro (69½ miles; 1,791 ft.).

A branch of the Bosa-Nuoro line runs from Tirso junction northwards over the granite plateau to the main standard-gauge line at Chilivani. The route, which is tortuous and fairly steep, keeps close to and often crosses road 128. Rising gradients of 1 in 55 are common as far as Bono (10½ miles; 1,473 ft.), whence the line descends with gradients of up to 1 in 85 to Benetutti station (19¾ miles; 1,073 ft.), which is 10 miles distant from the town. Between Tirso and Benetutti the railway crosses eight right-bank tributaries of the upper F. Tirso. North of this river the line begins an ascent of granite hills, the steepest gradient being 1 in 40 between Benetutti and Osidda (26 miles; 1,906 ft.), whence it diminishes to 1 in 130 onwards to Pattada (34 miles), in which area the summit height of 2,211 feet is

reached. West of Pattada the line falls with many sharp bends down the western edge of the granite massif, the ruling gradient from Pattada to the alluvial plain of the R. Mannu at Chilivani being 1 in 50. Chilivani (49 miles; 738 ft.) is the junction for the standard-gauge lines to Terranova, Cagliari, and Porto Torres.

South-Eastern Sardinia. The narrow-gauge lines of the Sardinian Complementary Railways which serve south-eastern Sardinia consist of a main line from Cagliari to Arbatax, with branch lines to the interior towns of Ierzu, Sorgono, Ales, and Villacidro. The relief is the most difficult in all Sardinia, and the whole of the area south and east of the line from Cagliari to Ierzu and Arbatax has no railway, public or private.

On leaving Cagliari the main narrow-gauge line winds northwards along the foot of the Sarrabus hills and bridges several streams flowing to the Campidano. The ascent is 1 in 50 for long stretches north of Settimo ($7\frac{1}{2}$ miles; 207 ft.), but only one short tunnel is necessary as far as Suelli (34 miles; 738 ft.). The ascent steepens and the route becomes more tortuous north to Mandas ($42\frac{3}{4}$ miles; 1,611 ft.), where, turning eastwards, the line becomes increasingly difficult as it enters upon the schist and limestone hill-massif. Since the general drainage of the country is south-eastward the railway bridges numerous streams and, in spite of long detours, tunnels beneath the intervening spurs. Consequently, the line is a succession of dizzy twists and turns, and gradients of between 1 in 40 and 1 in 60 are common. Among the more difficult stretches is that near Nurri ($58\frac{1}{2}$ miles), where after crossing a watershed at 1,837 feet, the line descends a narrow valley to a bridge over the F. Flumendosa (784 ft.) and then climbs out of the deep gorge by means of a long detour and a gradient of 1 in 40. Equally typical are the spiral curves ascending the hills east of Sadali ($79\frac{1}{2}$ miles; 2,503 ft.) and the four hairpin bends across valleys of small streams east of Seui ($87\frac{1}{2}$ miles; 2,667 ft.). In this locality landslides not uncommonly occur near the railway. At Gairo (104 miles; 2,572 ft.) a branch line runs south, on a falling gradient of 1 in 44, to Ierzu ($5\frac{1}{2}$ miles; 2,004 ft.), through an area where landslides are common. Beyond Gairo the main line makes a long detour northward to the shore of the Flumendosa reservoir, where it turns abruptly southward and reaches its summit level of 2,802 feet at Arzana ($112\frac{1}{2}$ miles), the highest railway station in Sardinia. Beyond Arzana the route crosses the steep granite slopes above the small alluvial lowland near Arbatax. The descent averages 1 in 37 as far as Elini ($123\frac{1}{2}$ miles; 1,549 ft.) and includes a spiral loop, several hairpin bends, and a short

tunnel. The descent-continues equally steep and tortuous beyond Elini to the Miremi valley (136 miles; 150 ft.), but once on the lowland the line takes an easy course on the edge of the plain to Tortoli and its port of Arbatax (141½ miles).

The plateau of Sarcidano and the highland of Gennargentu are served by a branch line running north from the Cagliari-Arbatax railway at Mandas. This branch makes a winding ascent of the hills near Serri (3 miles; 1,850 ft.) before descending, in parts with a gradient of 1 in 57, to the bridge over the R. Mannu at Sarcidano (11 miles; 1,365 ft.). Northward the route becomes more circuitous as the crossing is made of the limestone hills near Laconi (23½ miles; 2,083 ft.) and Ortuabis (29¾ miles; 2,539 ft.). Beyond Ortuabis, a winding, undulating course, partly in river valleys, is taken through schist hills to Belvi-Aritzo (47¼ miles; 2,060 ft.) and Sorgono (60¼ miles; 2,260 ft.). Throughout this section the bridges are small and there is only one long tunnel (1,100 yards; west of Belvi).

From the above line at Sarcidano a branch track runs south-westwards to the hills of south-western Sardinia, thus providing the only direct rail connexion between the two southern upland regions of the island. This line descends with gradients of up to 1 in 66 to the valley of the F. Mannu at Lasplassas (15½ miles; 472 ft.) and then follows the river most of the way to Villamar (20½ miles; 351 ft.) and Sanluri (27¼ miles; 374 ft.), a station on the Terranova-Cagliari line. Thence a direct course leads for 11 miles over the flat farmlands of the Campidano, two small streams and two canals being bridged on the journey. A winding ascent precedes the terminus of Villacidro (39¾ miles; 699 ft.) which lies on the eastern edge of the Iglesias hills.

From Villamar on the Sarcidano-Villacidro route a branch line leads north-westward over gently undulating farmland past Baressa to Ales (16¾ miles; 545 ft.). This line nowhere rises above 627 feet.

South-Western Sardinia. The Iglesias hill-mass of south-western Sardinia is served by a standard-gauge line from Decimomannu to Iglesias and by two narrow-gauge lines of the Sardinian Southern Railways. There are in addition four private mineral lines (p. 646).

The standard-gauge State line runs from the Cagliari-Terranova line at Decimomannu (30 ft.) westwards over the Campidano, crossing on the way the R. Mannu and one of its tributaries. After 5 miles the country becomes undulating and at Siliqua (8 miles; 177 ft.) a low watershed is crossed to the wide valley or structural depression drained by the R. Cixerri. The flat alluvial floor of this valley provides

a gentle uphill gradient but numerous bridges have been necessary, including two over the R. Cixerri and three over the R. s'Arriali. There is a slight rise over higher ground at the approach to the terminus at Iglesias ($23\frac{1}{2}$ miles; 577 ft.).

From Iglesias a narrow-gauge line of the Southern Railway winds on a falling gradient of up to 1 in 66 south-westward to Monteponi ($3\frac{3}{4}$ miles; 351 ft.) and Gonnese ($6\frac{1}{2}$ miles; 102 ft.), whence a slight ascent leads to Bacu Abis ($8\frac{3}{4}$ miles; 120 ft.). Throughout this section the railway runs almost parallel with and frequently crosses a mineral line to Porto Vesme. At Bacu Abis the main line turns southward and passes through the coal-mining district of Carbonia ($16\frac{1}{4}$ miles; 249 ft.) on the way to Palmas Suergiu (21 miles; 43 ft.). Over this route most of the passenger traffic is served by motor-buses owned by the railway company.

The other Southern Railway line traverses the hill-mass of the southern Iglesiente between Siliqua and Palmas Suergiu and continues to Calasetta on S. Antioco island. From Siliqua (177 ft.) the track rises, with gradients of up to 1 in 73 and with the aid of one short tunnel and a double-bend, to the watershed at Campanassissa ($10\frac{1}{2}$ miles; 942 ft.). A sharp descent, in parts at 1 in 50, leads to Narcao (18 miles; 381 ft.), whence the valley of the R. Mannu is followed much of the way to Santadi ($23\frac{1}{2}$ miles; 325 ft.). Here the railway turns westward and serves the larger villages of the low, undulating plain drained by the R. Palmas. Beyond Palmas Suergiu ($36\frac{1}{2}$ miles; 43 ft.), the junction for the narrow-gauge line to Iglesias, the line from Siliqua proceeds to the coast and crosses a new bridge to the isthmus connecting S. Antioco island with Sardinia proper. The railway keeps close to the main road as far as Porto Ponte Romano and S. Antioco ($42\frac{3}{4}$ miles), at both of which places there are short branch lines to the harbours. Beyond S. Antioco the line follows the low, flat coast to Calasetta ($49\frac{3}{4}$ miles). On this route also, much of the passenger traffic is taken by motor-buses run by the railway company.

CHAPTER XXIV

MINOR ITALIAN ISLANDS

IN addition to the large islands of Sicily and Sardinia, Italy possesses numerous minor islands, the enumeration of which has long intrigued Italian geographers. Excluding the Dodecanese, there are at least 117 islands of 15 acres or over in the kingdom. Of these 46 are described in the following chapter. Of the remainder a few lie so close to the mainland that they are islands only in name and are discussed with the adjacent coasts (Chap. III, Vol. I); 35 are off Sardinia and are dealt with in the account of that island, whilst Saseno is included in the volume on Albania (B.R. 542); the others are uninhabited rocks and barren islets. The Italian islands in the Aegean form the subject of a separate handbook (B.R. 500).

The islands described in the following pages fall geographically into three groups, situated off the west coast of the Peninsula, off Sicily, and in the Adriatic respectively (Pocket map, Vol. I). In the account of each island a description of its physical nature is followed by a summary of its economic development. It is interesting to notice that since 1921 the population of most of the islands has increased considerably, and that the use of the islands as penal colonies or places of exile is not modern but dates back in some instances to Roman times.

THE TUSCAN ARCHIPELAGO

THE Tuscan archipelago is scattered between the north-eastern coast of Corsica and the coast of Italy stretching from Leghorn to the Argentario promontory. The islands are separated by deep passages and form excellent landmarks for navigation. The main islands in order from north to south are Gorgona, Capraia, Elba, Pianosa, Montecristo, Giglio, and Giannutri; these together with several uninhabited islets and rocks cover a total area of 112 sq. miles (29,017 hectares) and support about 34,000 people. Elba, by far the largest and most important of the islands, contains about 30,000 of the inhabitants. The archipelago is under the civil administration of Leghorn province, except the small islands of Giglio and Giannutri, which fall within the province of Grosseto.

ELBA

Elba is the largest island of the Tuscan archipelago. Its eastern end is separated from the mainland by the Piombino channel (Plate 66), which is $6\frac{1}{2}$ miles wide at its narrowest part; its western extremity is 32 miles from Corsica. The island (Fig. 56) is about 17 miles long from east to west, and has a maximum width from north to south of $11\frac{1}{2}$ miles at its eastern end, but the width varies greatly owing to the irregularities of the coast. The estimated area is 86 sq. miles.

History

Elba, originally the home of a Ligurian tribe, was occupied by Etruscans from Populonia, who were attracted thither by the mineral wealth of the island. In the fifth century B.C. Greeks from Syracuse gained possession of it, and later it fell to the Romans. Virgil wrote of Elba as 'Insula inexhaustis Chalybum generosa metallis'. Already in his day the rich iron-ore mines of Rio Marina formed the centre of the island's industry. These were worked to the great advantage of the Romans, who also made use of Elba's excellent harbours as a naval base. During the Lombard invasions S. Certone, Bishop of Populonia, crossed with his clergy from the mainland to Elba, where he found a place of refuge from the barbarians. The Saracens more than once raided the island and for a time it fell into their hands. In the eleventh century it was acquired by the Pisans, who made it a base of operations in their struggle for control of the Tyrrhenian Sea. After the battle of Meloria (1284) the Genoese wrested it from their defeated rivals, but the Pisans regained possession of it in 1309. In 1399 Gherardo Appiani, lord of Pisa, sold the latter city to the Duke of Milan and was in return confirmed in the lordship of Piombino and Elba. The greater part of the island remained in the hands of the Appiani family for over 200 years. Jacopo Appiani was driven out by Cesare Borgia in 1501, but he returned on Borgia's fall and was invested with Elba as a fief of the Empire in 1509.

During the sixteenth century Elba became a prey to the attacks of Corsairs from north Africa. Khairaddin Barbarossa raided the island in 1534 and carried away the inhabitants as slaves. A few years later Charles V made over Portoferraio and its surrounding district to Cosimo dei Medici, who fortified it and gave it the name of Cosmopoli, which it retained as long as the Medici ruled over Tuscany. When in 1553 Barbarossa's successor, Draghut, seized the rest of the

island, Portoferraio put up a successful resistance, in recognition of which it was made part of Cosimo's Grand Duchy. A further inroad on the property of the Appiani was made in 1604, when Philip III of Spain fortified Porto Longone and incorporated the town in the Spanish dominion known as the *Presidii*. Elba now had three separate masters, and when the line of Appiani died out in 1634, their share passed first to the Ludovici and then to the Buoncampagni family. At the close of the eighteenth century Ferdinand III, Grand Duke of Tuscany, held Portoferraio, the Bourbon King of Naples ruled over Porto Longone, and the remainder of the island was in the hands of Don Antonio Buoncompagni. Of these only the King of Naples was openly at war with revolutionary France. Elba's divided allegiance and its importance in Mediterranean warfare made it a battlefield of the European Powers. The British occupied it in 1796, the French in 1799, and finally in 1802 by the Treaty of Amiens the whole island was ceded to France.

The most famous episode in the history of Elba is the ten months' sojourn there of Napoleon Bonaparte. By the Treaty of Fontainebleau the island was assigned to Napoleon for his life, as 'a principality to be held by him in full sovereignty'. In May 1814 he arrived at Portoferraio in a British frigate, flying the flag which he had designed for his new kingdom—*argent* on a bend *gules*, three bees *or*. His life on Elba was marked by unremitting labour for the improvement of its condition. Napoleon had roads made, trees planted, houses and a theatre built, and the fortifications strengthened. He introduced an improved system of working the iron-mines and developed local industries. Prince and subjects alike were content and happy. Then in February 1815 Napoleon sailed with a fleet of ten ships and 900 men for France and the Hundred Days. Elba's brief period of renown was over. By the Treaty of Vienna the whole island was given to the Grand Duke of Tuscany, and in 1860 it became part of the Italian kingdom. After the defeat of Napoleon III at Sedan (1870) it was rumoured that he contemplated retiring to Elba. Thereupon the Mayor of Portoferraio wrote a letter to the fallen emperor, signed by fifty-five notables of the island, offering him hospitality and assuring him of a warm welcome. In Elba, it said, 'the memories of 1814 and 1815 have never been effaced'. To-day, on the anniversary of Napoleon's death, a mass for the repose of his soul is said every year in the church of the Misericordia at Portoferraio and all visitors to Elba go to see his Villa at S. Martino.

Geology and Relief

The island is mainly mountainous with steep rocky coasts, but there are small plains at the heads of the larger bays, some of which connect across the island by low cols, and thus divide the hills and mountains into isolated groups. The surface of the island consists of five parts, comprising the Western Mountains; the Western Valley running from the gulf of Procchio to the gulf of Campo; the Central Hills; the Eastern Valley running from the Portoferraio roadstead to the gulfs of Stella and Porto Longone; and the Eastern Peninsula.

The Western Mountains culminate in M. Capanne (3,342 ft.), the highest peak on Elba. This mountain is in the centre of the western peninsula, and the land slopes steeply on three sides to the coast and on the east side to the Western Valley. The main mass of the mountain is granite, surrounded by a discontinuous coastal belt of serpentine, porphyry, and other rocks. As frequently happens in granite mountains, the higher slopes are craggy, and the lower more rounded. The streams have a general radial arrangement, but as the main ridge at the summit of M. Capanne has a north-west to south-east trend for about $1\frac{1}{2}$ miles, the rivers flowing north-east to Marciana Marina (Plate 69) and south-west to the coast near Pomonte are slightly longer than those flowing to the north-west. Most of the streams have steep gradients and have cut deep valleys; those flowing south-east to the gulf of Campo cross Eocene limestone in their lower courses and have gentler gradients.

The Western Valley which crosses the island from the gulf of Procchio to the gulf of Campo includes the small cultivated coastal plain round Procchio in the north and the wide valley of the Fosso Golca in the south. The low col between these two plains at Casa del Colle (154 ft.) is nearer the north coast than the south. The alluvial deposits on both sides of the watershed consist of sand and gravel, some of which belongs to old sea-beaches.

The pattern of the Central Hills consists of two main ridges at right angles. The first ridge extends southward from M. Poppe (817 ft.) past a col at 390 feet to M. San Martino (1,214 ft.), and then through M. Tambone (1,243 ft.) and M. Fonza (974 ft.) to Cape Fonza. This ridge forms the watershed between streams flowing into the Western Valley, the Fosso di Madonnina, which flows north-east into the Portoferraio roadstead, and streams flowing south-east to the small Lacona plain at the head of the gulf of Lacona. The second ridge extends eastward from M. San Martino to M. Orello (1,237 ft.);

from it a spur stretches southward through Poggio Corsetti (938 ft.) to Cape Pini, cutting off the Lacona plain from the Eastern Valley. Between the gulf of Lacona and the gulf of Stella there is a small promontory which culminates in M. Capo Stella (512 ft.) and is cut off from the main central hills by the Lacona plain. Another small coastal plain west and south of Portoferraio roadstead is separated from the Eastern Valley by a ridge running north from M. Orello to Point Grotte. The alluvial origin of these small plains is similar to that of the western valley. Most of the peninsula, between Cape Enfolà and Portoferraio and the hills from Biodola bay to Cape Fonza are formed mainly of porphyry, while the ridge from Cape Grotte to Capes Stella and Pini consists mostly of serpentine and similar rocks. Much of the middle part of the central hills is formed of Eocene rocks, including some limestone.

The Eastern Valley, which separates the Central Hills from those along the east coast, is not so simple in structure as the Western Valley. The small coastal plain east of Point Grotte rises to a col at Casa Marchetti (154 ft.), which is about half-way between Portoferraio roadstead and the gulf of Stella. The Fosso di Valdana valley leads south-south-east from this col to the coastal plain between the gulf of Stella and Porto Longone. This plain is about 1 sq. mile in area, and is partly alluvial and partly built of old sea-beaches which rise to a height of 600 feet near Capoliveri. The low hills obstructing the central part of the eastern valley are formed of Permian schists, Lias limestone, and Eocene sandstone, limestone, and schists.

The Eastern Peninsula, with its precipitous ridges alternating with deep ravines, forms one of the wildest parts of the island. Its north-south direction is determined mainly by the grain of the rocks, which between Cape Calamita and the neighbourhood of Rio Albano, consist of schists, mostly Permian, containing the famous iron ore. These schists are separated by bands of serpentine from Eocene rocks, which form the western part of the peninsula north of the gulf of Porto Longone. The main watershed of this peninsula runs south-south-west from Cape Vita and culminates in Cima del Monte (1,693 ft.). The general slope of the country on the east side, especially between Rio Marina and Porto Longone, is more gradual and the valleys longer than on the west. The country south of the gulf of Porto Longone is also mainly hilly, culminating near its centre in M. Calamita (1,355 ft.). The valleys tend to be arranged radially, though their dominant directions are west and north-east.

Some of the harder rocks in the Eastern Peninsula stand out as the rugged features of the scenery. Among the more resistant rocks are veins of quartz and granite among the schists, and a particularly hard silicified limestone (*diaspri*) in the Eocene formation, which forms the most rugged peaks north of Porto Longone, including the summit of Cima del Monte.

The Coast. The coast of Elba is extremely indented, and, with a length of about 90 miles, is much longer than might be expected for an island of its size. The length of the coast is partly due to the two main bays of the north coast, the gulf of Procchio and the roadstead of Portoferraio, and the three main bays of the south coast, the gulfs of Campo, Lacona, and Stella, and partly to the north-south elongation of the eastern peninsula. The east coast is lengthened by the gulf of Porto Longone, and by many small indentations. The width of the island narrows to little over 2 miles between the gulf of Procchio and the gulf of Campo, and also between the Portoferraio roadstead and the gulf of Stella.

Portoferraio roadstead, on the north coast, is $1\frac{1}{4}$ miles wide at its mouth, measures $2\frac{1}{2}$ miles from east to west and $1\frac{1}{4}$ miles from north to south. It is the only bay round the island which narrows towards its mouth, thereby giving extra shelter and allowing the Madonnina stream to build out a small delta from the inner shore of the roadstead. There is no other delta round the coast of the island. The western shore of the roadstead is flat and marshy, and is bordered by a small plain extending inland to the foot of M. Poppe. East of Point Grotte the long beach of Lo Schiopparello fringes the plain which stretches southward to the col at Casa Marchetti. The east shore of the roadstead is bordered by shorter beaches alternating with hilly points. The most northerly of these beaches, Spiaggia di Bagnaia, has access inland to a track leading to the village of Rio dell' Elba. The coast north-north-east of the roadstead for about 4 miles to Cape Vita is steep and hilly, with only very small bays and beaches.

The whole eastern coast of the island has a general north-south direction except for the large inlet of Porto Longone. The northern part of this coast is less steep than that between Point Falconaia and Cape Vita, and communications are much better, a coast road having been built as far north as Cavo, within 1 mile of Cape Vita. Porto Longone has the only important harbour on this coast, which is in general devoid of definite bays or beaches. There are, however, small piers and jetties at a number of places, and those at Rio Albano, Vigneria, and Rio Marina are used for loading ore from the ironstone



PLATE 65. *Rio Marina, Elba*



PLATE 66. *Elba from Piombino*

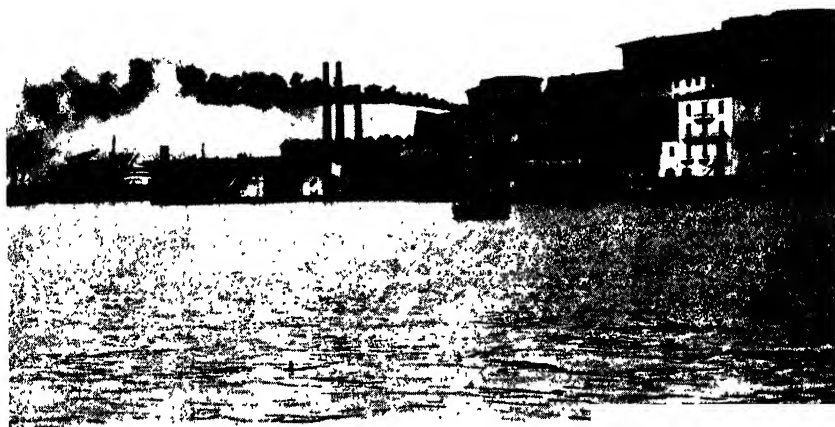


PLATE 67. *Portoferraio*



PLATE 68. *Iron-ore quarry in Elba*

quarries. Since the coast road usually keeps some height above the shore, communication with most of the piers is by tracks, though a pier and mole at Rio Marina (Plate 65) are connected with the village by direct roadway.

The coast from Rio Marina to Cape Arco (Point Cannelle) is mainly wild, with no harbours; the coast road from the north turns inland at Rio Marina, and the track which follows the coast does not lead to any villages. The only valley of any size entering this stretch of coast ends at a small sandy bay, Spiaggia d'Ortano. There are one or two small piers on this coast, but they are of little importance.

The bay on which Porto Longone stands is funnel-shaped, with a mouth nearly 3 miles wide, and a length of $2\frac{1}{2}$ miles. The northern shore is mostly hilly, and is indented with three valleys leading down from the hills south of Cima del Monte. The road from Rio Marina approaches Porto Longone by the most easterly of these. The fort of Porto Longone is situated on a rounded cape between two coves, and the village clusters on its north-west side. The more westerly of the two coves is used as the harbour, and has a short protecting mole. The beach at the head of the bay at Spiaggia del Mola is backed by the flat land of the south-eastern end of the Eastern Valley. The south side of the main bay consists of small alternating capes and inlets.

The Calamita peninsula, which forms the south shore of the gulf of Porto Longone, is steep and rocky with few beaches as far as Point Calamita at its southern end. In the extreme south the coast road, which exists as such only south of Point Buzzancone, runs high up on the hill-side; most of this stretch is uninhabited, though there are a few isolated quarries (Plate 68). The west side of the Calamita peninsula is more hospitable than the east, as there are several coves with beaches, some with short piers. The iron quarries at Point Calamita are connected by tracks and an aerial ropeway with loading piers. One or two small settlements occur along this part of the coast, but the road to Capoliveri keeps to the hill-side about half a mile inland; there are, however, tracks connecting the coves with each other.

The gulf of Stella, the most easterly of the three large bays on the south coast of Elba, is about $2\frac{1}{2}$ miles wide at its mouth and extends about 2 miles inland. Most of its eastern side is bordered by steep hills and cliffs, but a beach in the north-east corner (Spiaggia del Lido) is backed by the flat country of the Eastern Valley and is connected by tracks with roads south to Capoliveri and west to Palazzo. This beach faces waves with a fetch of some 90 miles which

come in with south-westerly storms, and, unlike the beach in Portoferraio roadstead, obtains little protection from the headlands at the mouth of the bay. The hills south of M. Orello extend to the shore of the bay, where they end in cliffs. A military road crosses the seaward flank of these hills at a height of about 300 feet above sea-level and at the north-western corner of the bay approaches the shore of the cultivated plain of Lacona, which joins the long hilly headland of Cape Stella (512 ft.) to the rest of the island.

Cape Stella separates the gulfs of Stella and Lacona from each other. The gulf of Lacona is the central bay of the south coast and measures about $1\frac{1}{2}$ miles across its mouth and about $1\frac{3}{4}$ miles from north to south. Its northern shore borders the Lacona plain for about 1,100 yards, and has a beach which faces almost due south, and is only partly protected from south-westerly gales. The slopes of M. Fonza descend steeply to the western side of the bay, and in the south end in cliffs 300 feet high near Cape Fonza and near Point Mele, about a mile farther west.

The gulf of Campo, at the south end of the Western Valley, is about $1\frac{3}{4}$ miles wide across its mouth and about $1\frac{1}{2}$ miles long from its mouth to the beach at its head. The village and small harbour of Marina di Campo are on the western shore, protected on the south by a rocky headland. The village is the terminus of the road which crosses the island from north to south through the Western Valley. The curved beach at the head of the bay is about a mile long, and backs on to the cultivated plain, from which it is separated by dunes. The beach faces south-east, and is breached at each end by the mouths of streams. The coast of the bay between Marino di Campo and Point Campo is steep and increases in height southwards, ending in cliffs 300 feet high.

The coast from Cape Campo to Marciana Marina round the west end of Elba is very steep, and for about 15 miles is devoid of well-marked capes and bays except for the pointed promontory of Point Fetovaia. There are several stretches of cliff, including one which rises to nearly 500 feet at the Sedia di Napoleone. Such streams as exist descend steeply to the sea by valleys 2 to 3 miles long, with little or no flat land or beach at their mouths. A track follows the southern and western parts of the coast, but it seldom leads down to the shore, and is sometimes some 300 feet above it. Near the high cliffs at Sedia di Napoleone the path turns inland, and continues as a road from Zanca to Marciana. Tracks branch off the coastal route and follow the sides of the steep valleys inland, the highest crossing a saddle at about

3,000 feet in the main ridge of M. Capanne. Settlements and houses are mostly at low levels on the southern side of this peninsula, but are more frequent and at both low and high levels on the northern side.

A number of valleys converge from the north-east side of M. Capanne to form the valley of the Fosso Marciana, at the flat seaward end of which the village of Marciana Marina stands on a small bay with a shingle beach. There is a mole and a short jetty here.

The coast between Marciana Marina and Cape Enfolà forms a large bay, of which the south-western shore is relatively straight and the eastern side deeply indented. The part between Marciana Marina and Point Agnone trends south-east for about $2\frac{1}{2}$ miles and has no well-marked bays; it is rocky, backed by steep hills, and subject to landslides. The small village of Bagno is situated about half-way along this stretch on the road which runs near the shore.

The coast turns north-east from Point Agnone to Cape Enfolà, and is formed by the gulfs of Procchio, Biodola, and Viticcio, and their intervening points. The gulf of Procchio is backed by the small plain round Procchio village, which is the junction of roads from Portoferraio, Marina di Campo, and Marciana. The beach at the head of this bay is separated from the plain by dunes. Like the beach at the head of the gulf of Biodola it faces north-west, from which direction storm-waves have a fetch of about 130 miles. Neither of these bays is narrow enough at its mouth to reduce wave-action to any great extent. The gulf of Viticcio is rocky and has no beach at its head. Only short valleys enter these three bays, as the watershed is less than a mile from the shore. The spur forming Point Cote Piane is higher than that ending in Point Penisola, and is crossed by the road to Portoferraio which follows a col at about 390 feet above the sea. In addition to Procchio village there are a number of houses in the plain bordering the gulf of Procchio, but houses are scarcer near the gulfs of Biodola and Viticcio. Military roads have been built from the Portoferraio road to points near the southern end of the gulf of Biodola and the north end of the gulf of Viticcio, but these were not designed primarily to reach the shore, which is followed by rough tracks between the gulfs.

Cape Enfolà, the extremity of a steep, bare, rocky peninsula rising to 443 feet, is joined to the mainland by a low narrow neck of land. The $3\frac{1}{2}$ -mile stretch of coast between it and Portoferraio is high and steep, with cliffs up to 300 feet high as far as M. Bello, but is lower, though hilly, near Portoferraio. Along most of this coast there are rough tracks which serve isolated houses.

The proximity of Elba to the mainland deprives its ports of any possible international importance. The national importance of the island lies mainly in its iron-ore deposits, the transport of which affects a good many small harbours but has created only one notable port, Portoferraio.

Portoferraio (Fig. 57; Plate 67)

Position and Site. Portoferraio, on the eastern of two large bays on the north coast of Elba, is built on a rocky promontory which partly closes the entrance to the roadstead on its western side. The eastern half of the promontory is hilly and is dominated by the Forte Falcone (260 ft.) on the north-west and by the Forte Stella (200 ft.) on the north-east. The Forte Falcone rises abruptly above a valley which crosses the promontory and expands south-westward into a low plain about half a mile wide skirting the western shore of the roadstead. The steep northern side of the peninsula slopes from the forts to the two main indentations on its south shore, the Seno del Ponticello and the Darsena. The rectangular basin of Darsena is thus the centre of the amphitheatre in which the town is built.

The old town is entered through the Porta a Mare gateway, which forms the only break in the continuous curve of buildings surrounding the Darsena. The tall stone houses rise in low terraces above the harbour, and some of the streets consists of flights of steps. The cathedral, Town Hall, Post Office, and hotels are on the central square, the Piazza Vittorio Emanuele. Most of the valley crossing the peninsula west of the old town is occupied by barracks and the public gardens. A new suburb flanks the hill north of the Ilva iron and steel works, which, with an adjacent cement works, cover the plain for about three-quarters of a mile along the north-west shore of the roadstead.

Description of Port. The approaches to the harbour are unobstructed and the entrance to the bay, between Point Falconaia on the east and the Portoferraio promontory on the west, is about $1\frac{1}{4}$ miles wide with depths of 84 to 132 feet. There is anchorage in depths of 48 to 60 feet on the east and west of the bay, and immediately south of the steel works.

The harbour consists of two parts: the old harbour, the Darsena, facing south-west, and the Seno di Ponticello to its south-west and facing south-east.

The Darsena is a rectangular quayed basin, about 800 feet long and 650 feet wide, with a short mole used by passenger steamers at its

head. The entrance, about 400 feet wide, is between Punta del Torrione at the head of the south-east side and the Moletto della Sanita (del Gallo), which projects at right angles from the opposite side. Depths in the centre of the basin are from 26 to 33 feet, decreasing to about 17 feet close off the quays. The whole harbour is enclosed by buildings. Quays are 3 feet high.

Along the north shore of the Seno del Ponticello a dog-legged quay extends for approximately 500 feet westwards from the root of the Moletto della Sanita. At its western end is a small boat-repair yard with a slipway, flanked on the west by a shallow beach and a hauling-up hard. From the western shore four piers project south-eastwards, serving the steel works behind. The northernmost pier, the Pontile Hennin, is detached, but is connected to the mainland by an iron framework conveyor bridge.

Name	Depth alongside (feet)	Length (feet)	No. of cranes	Facilities, &c.
<i>La Darsena</i>				
Calata della Torre (SE.)	18	525	—	Naval vessels. Craft refuelling. Naval barracks behind.
Calata Vittorio Emanuele II (NE.)	12	260	—	Sailing- and fishing-boats.
Passenger Mole (NE.)	13	130	—	40 ft. wide. Mail steamers.
Calata Umberto I (NW.)	12-15	200 + 150 + 600	—	Sailing- and fishing-boats.
Moletto della Sanita				
North side	15	215	—	Sailing- and fishing-boats.
South-east end	18	100	—	..
South side	8	100	—	..
<i>Seno del Ponticello</i>				
North-east quay	6-15	230 + 250	—	Tankers.
Pontile Hennin	29½	400	9	Detached iron pier. Iron work conveyor bridge to shore 425 ft. long. Coal and iron-ore.
North central pier	16	c. 200	1	Iron-ore, pig-iron, and steel. 50 ft. wide with depths of 18 ft. at head. Small jetty, 80 ft. long and 25 ft. wide, north-eastwards from root.
South central pier	16	c. 200	1	Iron-ore, pig-iron, and steel. 45 ft. wide.
South pier	19½	550	3	Iron-ore, pig-iron, and steel. 45 ft. wide with depths of 32 ft. at head.

Port Facilities. The Captain of the Port's office is on the Calata della Torre, while the customs-house is in the building north-east of the root of the passenger mole. All cranes are on the Ilva piers,

the nine on the Pontile Hennin being travelling gantries of 2 to 10 tons capacity.

The port is not a bunkering station, but large supplies of coal are normally held by the Ilva works. With the recent development of the submarine base supplies of oil will probably have been built up, but quantities are not known. There are pipe-lines from the head of the Moletto della Sanita, and a tank (probably disused) about 150 yards north-west of its root. Two more tanks are reported to the north of this tank under the western slopes of Forte Falcone. There are hydrants on the west side of the Darsena, the Calata Umberto I, and water-lighters to supply ships, but supplies are apt to be inadequate in summer. The quays of the Darsena and the Pontile Hennin are electrically lit.

The shipyard in the north of the Seno del Ponticello is capable of repairs to small vessels only. It has a slipway approximately 50 feet wide. There are no other repair facilities.

Although the Darsena is completely shut in by buildings, the two gates of Porta a Mare at the root of the passenger mole give access to the town, and the roadway round the basin connects from the south-west corner round the north of the Seno del Ponticello to the main road running south-west inland. There are no rail tracks other than the industrial lines leading from the three southern piers into the works.

Trade and Connexions. The chief commodity handled by the port is iron ore, much of which is brought by lighter from the east of the island to the Ilva steel works. Other imports are coal, coke, manganese, flour, cattle, and building materials. Exports include pig-iron, steel, wine, and tunny. The volume of traffic is shown in the following table:

		1938	1939
Ships entered: number	.	2,564	2,433
	tonnage	837,000	670,000
cleared: number	.	2,563	2,435
	tonnage	837,000	670,000
Goods landed: tons	.	733,000	507,000
loaded: tons	.	366,000	259,000
Passengers disembarked	.	30,382	39,028
embarked	.	29,607	39,113

There are local services twice daily (but only once on Sundays) to Piombino, weekly to Leghorn, and weekly to the many small ports round the island. The Leghorn-Piombino-Pianosa service calls

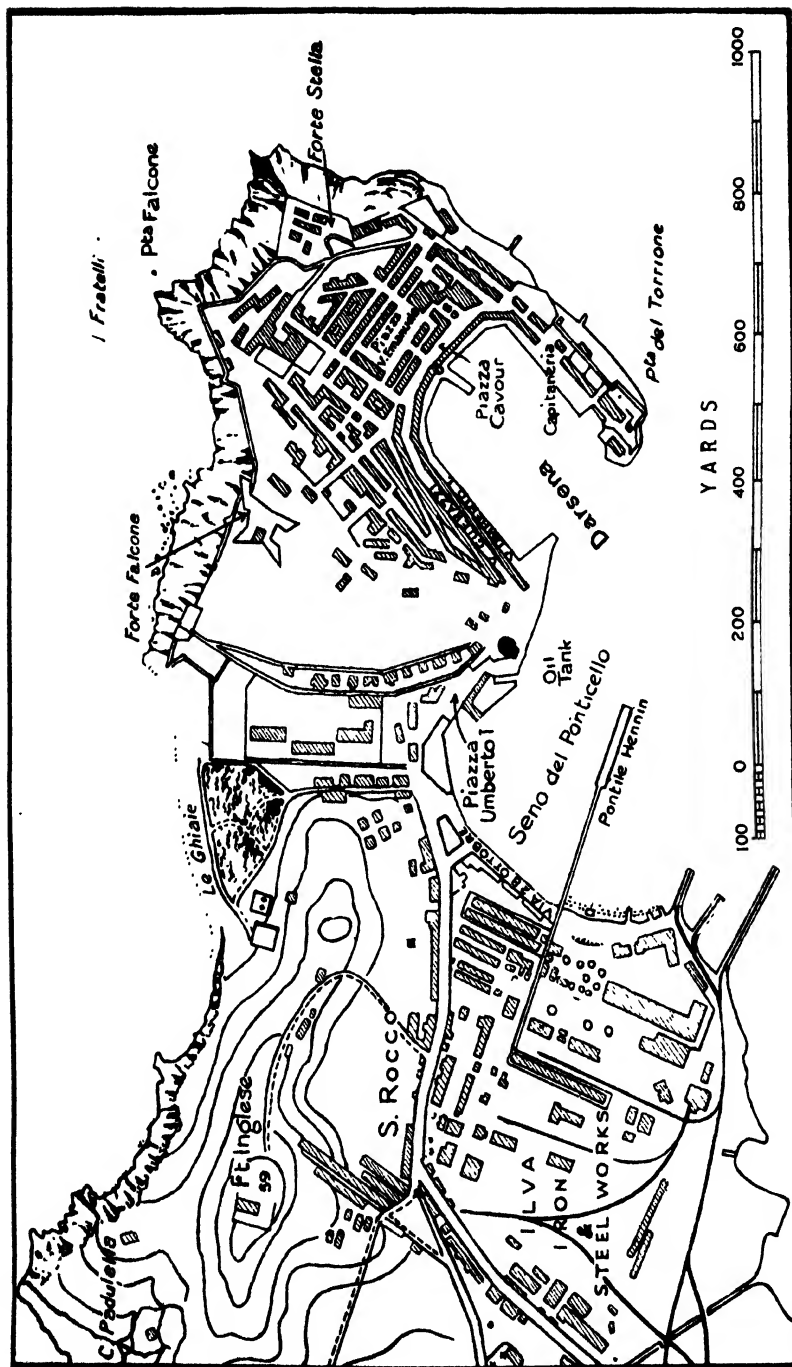


FIG. 57. Portoferraio

twice weekly, and the weekly services from Genoa via La Spezia and Leghorn to Sardinia and Palermo call in alternate weeks.

Climate and Vegetation

The climate of Elba is typically Mediterranean and does not differ in any noteworthy respect from that of the adjacent mainland. Sunshine records show an average of 167 clear days a year. The winters are mild, as would be expected from the insular position, and frosts normally occur only once in every five or six years.

The vegetation is far from profuse, although the natural growth and agricultural crops combine to give the northern and eastern sides of the island a well-cultivated and pleasing appearance. Trees are scarce, and the only sizeable wood consists of about 1,500 acres of chestnut on the hills south of Marciana. Considerable deforestation has taken place, especially on M. Capanne. Pines grow near the Villa Napoleone and on the dunes at the head of the gulf of Campo, cork mostly near Portoferraio, and ilex at a few scattered localities. Willows, poplars, and mulberries grow near the irrigation ditches where the streams enter the small plains, and almonds, olives, mulberries, and a variety of fruit trees are cultivated to a small extent.

The natural vegetation on the hill slopes is similar to the *macchia* of other parts of Italy, and consists of thick scrub up to about 6 feet high, usually thorny. It is more widespread on the northern than on the southern side of the hills, and occasionally reaches the coast. This scrub-growth is the home of a south European viper (*Vipera aspis*), which presumably arrived at Elba when it was still part of the mainland. Wild boars and wolves formerly lived on the island, but have now been exterminated. More than one species of mainland lizard is found.

Water-supply

Water-supply is adequate, although droughts occur frequently. Mean annual rainfall varies in different parts of the island, the range being from about 25 to 42 inches. As many of the rocks are impervious, especially the serpentine, much of the rain returns to the sea by direct run-off, but owing to the small size of the island, few streams are more than 2-3 miles long, and most of these are dry for many months of the year. Springs are most numerous on the north-east and eastern flanks of the M. Capanne range, on the southern slopes of M. Orello, and near Rio dell' Elba. The Fosso di Marciana is notorious for its destructive floods. The alluvial deposits, including

the old marine beaches, are permeable and hold enough water to supply shallow wells. The springs or wells near the shore of the gulf of Stella yield a reliable supply, but wells near the head of the gulf of Lacona are not reliably perennial. Piped supplies have been laid on for Portoferraio from M. Perone, 6 miles to the west, to Capoliveri from M. Orello, and to Rio Marina, Porto Longone, Marina di Campo, and Marciana Marina.

Population

The total population of the island is reported to have been 30,384 in 1939; with an estimated area of 86 sq. miles this gives a density of 353 persons to the square mile. As nearly all the people live below 800 feet the actual density in the valleys and coastal plains is considerably greater, perhaps as much as 480 to the square mile. In 1939, when the town of Portoferraio had 7,682 inhabitants, the population of the other main settlements was reported to have been: Rio Marina 2,815, Capoliveri 2,038, Porto Longone 1,995, Rio dell' Elba 1,665, and Marciana Marina 1,274. Most of the people tend to be concentrated in the eastern parts of the island, and this is largely true of dispersed as well as of grouped settlements. On the plains the small farm-houses are usually near to each other, but the peasants who live in the hills tend to be crowded into small stone-built hamlets, some of which are situated on exposed ridges and hill-tops.

Buildings in the small towns may be 3 or 4 stories high, but those in the villages seldom have more than 1 or 2 stories. In addition to piped water-supplies, some of the larger settlements have a public electricity supply. The main power station at Portoferraio has a capacity of 8,200 kW., and distributes 3-phase A.C. current (50 cycles) at 150/260 volts to Portoferraio, Campo nell' Elba, Capoliveri, Marciana and Marciana Marina, Porto Longone, Rio Marina and Rio dell' Elba. The station is coal-fired, but as no workable coal seams are known on the island, all coal has to be imported both for making electricity and for domestic use.

Industries

The fact that more people live in the eastern part of the island than in the west is mainly explained by the location of the iron industry, since it is estimated that about 20 per cent. of the workers are engaged in mining, industry, and transport. The iron ore occurs in the schists (mostly of Permian age), in which they were mineralised at the same time as the formation of the Tertiary granite of the island. It consists

mostly of limonite and haematite, and analysis shows 51 per cent. iron, 10 per cent. silica, and only 0.07 per cent. phosphorus, and 0.09 per cent. sulphur. The ore is quarried at a number of places along the east coast (Plate 68); the most important in order from north to south are Rio Albano, Vigneria, Rio Marina, Terranova, and Point Calamita. Narrow-gauge railways and aerial ropeways are used to bring the ore to the jetties, and it is exported in various kinds of craft, including lighters and steamers. The annual output of ore in recent years has been about 500,000 metric tons, or at least half the total Italian production. Future prospects are good; in the middle of last century reserves were estimated at 4 to 8 million tons, and although well over 8 million have been quarried since, there are still large ore bodies left. An exact estimate of reserves is difficult, but it certainly amounts to several million tons.

Part of the ore is shipped to Portoferraio for smelting, the remainder mostly to Piombino, Bagnoli (Naples), and Servola (Trieste). The works at Portoferraio are situated in a new industrial suburb south-west of the old town, and are said to employ about 2,000 workmen. They are government-owned and operated by the Ilva combine. They contain three blast furnaces and two Bessemer converters, as well as coke ovens; two new furnaces were also built, but not used, prior to 1939. The annual output from the works is reported to be 250,000 tons of pig-iron, about one-quarter of Italy's total.

Prospects for future mining extension on the island are somewhat uncertain, apart from the established iron-ore workings along the east coast. Schists similar to those containing ore bodies near the coast also occur at M. Fabbrello, near Capoliveri, but no paying ore has been reported from here. Magnesite appears to be quarried under the name of 'kaoline' near S. Ilario and S. Piero, but its magnesium content or uses are not known. Tourmaline occurs in various rocks in the western granite area and tin should therefore be expected; tin ore has been reported in small quantities, but is not known to be worked commercially. Granite and other rocks are quarried for building material and road metal, and there is a cement works adjoining the Ilva iron works at Portoferraio.

In addition to mining and metallurgy, agriculture is an important occupation of the islanders, but most of the produce is for home consumption rather than export. The most important crop is the vine, which flourishes both on the plain and on hill-terraces up to about 400 feet, and sometimes higher. Vineyards are most abundant in the south-eastern and western districts. Cereals, especially oats,

are also grown, but in quantities which hardly satisfy the island's needs. Various vegetables are cultivated in some places on the plains, but not for export. Fishing is also important, there being several centres of tunny and sardine fishing, and sardines are exported. Fixed tunny nets are laid off Cape Enfolà and several other points of the north coast and off Point Bardella near Marina di Campo on the south coast.

Communications

There are no railways on the island except those used in the quarries and in the industrial works at Portoferraio. The roads are, however,

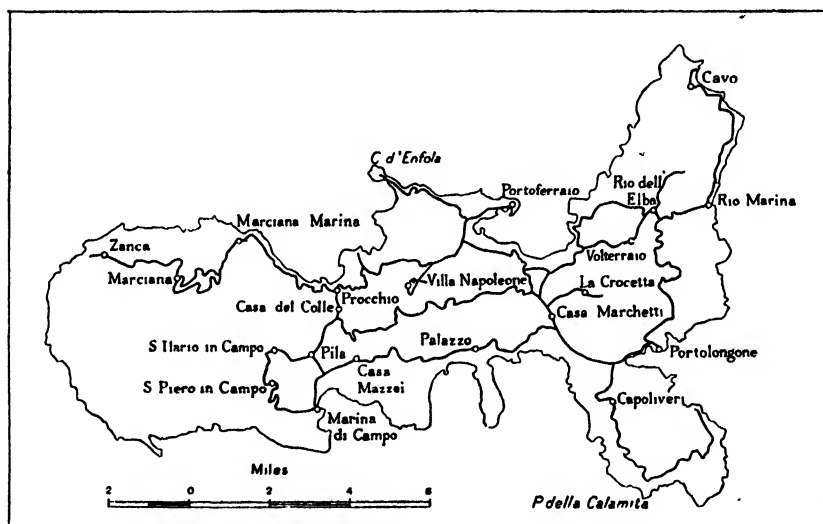


FIG. 58. *The main roads of Elba*

relatively good (Fig. 58). Some are metalled, and as they have a width of 16–20 feet, most lorries or buses can pass each other except in occasional village streets. There are also unmetalled roads about 10–16 feet wide, and single-line lorry traffic is necessary on them, although cars can pass in places. Broken granite is the usual foundation, with granite or occasionally porphyry chips as a surface, which is only sometimes macadamized. The roads are not usually well cambered, but otherwise are well engineered. In the hills they tend to be cut into the hill-sides instead of following the valley bottoms, and there are few gradients steeper than 1 in 14, the steepest in

one place being 1 in 7. Bridle-paths or tracks and foot-paths are numerous.

The natural routes of the island are mostly near the coasts, except for the cross-valleys on either side of the Central Hills which give easy access from the north to the south coast. These two natural routes are followed by roads, leading respectively from Procchio to Marina di Campo and from Portoferraio to Capoliveri and Porto Longone. The only other roads which do not follow a part of the coast are the short branch up the Fosso di Madonnina to the Villa Napoleone, and the military roads crossing the Central Hills.

The road from Portoferraio to Cavo ($22\frac{1}{2}$ miles) keeps to low ground as far as Porto Longone, except for cols at about 150 feet near Point Grotte and at Casa Marchetti. Between Porto Longone and Rio Marina it is more hilly and the road climbs to about 500 feet before descending to the coast at Cavo. The surface is metalled at least as far as Rio Marina. There are short side roads to La Crocetta in the eastern valley and to the village of Rio dell' Elba, as well as a longer branch road to Capoliveri (12 miles) and part of the way round the Calamita peninsula. This road is probably metalled, and ends in a track near Point Buzzoncone.

The north coast route from Portoferraio to Marciana (15 miles) crosses the small coastal plain south-west of Portoferraio, and then climbs to a col (390 ft.) before descending to the Procchio plain. The coast is next followed to Marciana Marina, where the road turns inland to climb up a valley through the chestnut forest to Marciana. As far as Marciana the road is metalled, but its continuation is unmetalled to a point beyond Zanca, where it deteriorates into a track. The short branch (1 mile) to Villa Napoleone is metalled, but two military roads leading towards the north coast near Cape Enfolà and the gulf of Biodola are narrow and unmetalled. Between Casa Leoni and Marciana a local road forms an alternative route.

The road along the Western Valley from Procchio to Marina di Campo ($10\frac{1}{2}$ miles) runs through low cultivated land, except where it crosses the col at Casa del Colle (154 ft.), but the loop road round the district of Campo nell' Elba (7 miles) is more hilly as it serves the mountain villages of S. Ilario in Campo and S. Piero in Campo. A short by-pass avoids a bottle-neck in the village of Pila. All the roads in this group are metalled.

Two new military roads cross the central hills from east to west, thus linking the roads down the Eastern and Western valleys. The more northerly of these (9 miles) was completed about 1938. It

leaves the Portoferraio-Porto Longone road about 4 miles from Portoferraio, and leads westward mostly along ridges and hill-slopes flanking M. Orello and M. San Martino to a point just south of the Casa del Colle on the Procchio-Marina di Campo road. Although the road passes through very hilly country covered with chestnut trees and *macchia*, it is well built, and steep gradients are as far as possible avoided, though there is one of 1 in 7. The other east-west road (8 miles) was finished after 1939. It leaves the Portoferraio-Porto Longone road near Casa Marchetti, crosses the Lacona plain through Palazzo, climbs to about 1,000 feet at Casa Mazzei in a col between M. San Martino and M. Tambone, and then descends to the Procchio-Marina di Campo road about $1\frac{1}{2}$ miles north of the head of the gulf of Campo. Both of these military roads are metalled.

A few tracks are passable for cars, but can hardly be classed as roads. Two of these lead from the south-east shore of the Portoferraio roadstead past Point Pina and Volterraio respectively to Rio dell' Elba. Most of the tracks are, however, difficult for wheeled traffic.

In 1939 there were 100 motor vehicles on the island, including buses, lorries, and private cars. There are reported to be 8 buses at Portoferraio, which run services, once or twice daily, to Marciana via Marciana Marina, to Marina di Campo, and to Porto Longone, Capoliveri, and Rio Marina.

GORGONA

Isola di Gorgona, the northernmost islet of the Tuscan archipelago, lies about 23 miles south-west of Leghorn. It is roughly quadrilateral in shape, its greatest measurements being $1\frac{1}{4}$ miles by 1 mile and its area just over $\frac{3}{4}$ sq. mile. The schists or gneisses, which form the greater part of its surface, have been eroded into a broken, hilly relief, especially in the west, where Point Gorgona rises to 837 feet. Much of the island is covered with low scrub and a thin growth of pine, cypress, oak, olive, chestnut, and fig, which afford cover for wild rabbits and, in the seasons of migration, for numerous birds. Although water is not abundant, its quality is excellent. The island rises steeply from deep water and offers no secure anchorage, but landing by boat is possible at several coves. The principal landing-place is on the east coast at Cala dello Scalo, where a breakwater extends about 200 yards north-eastwards from the southern shore.

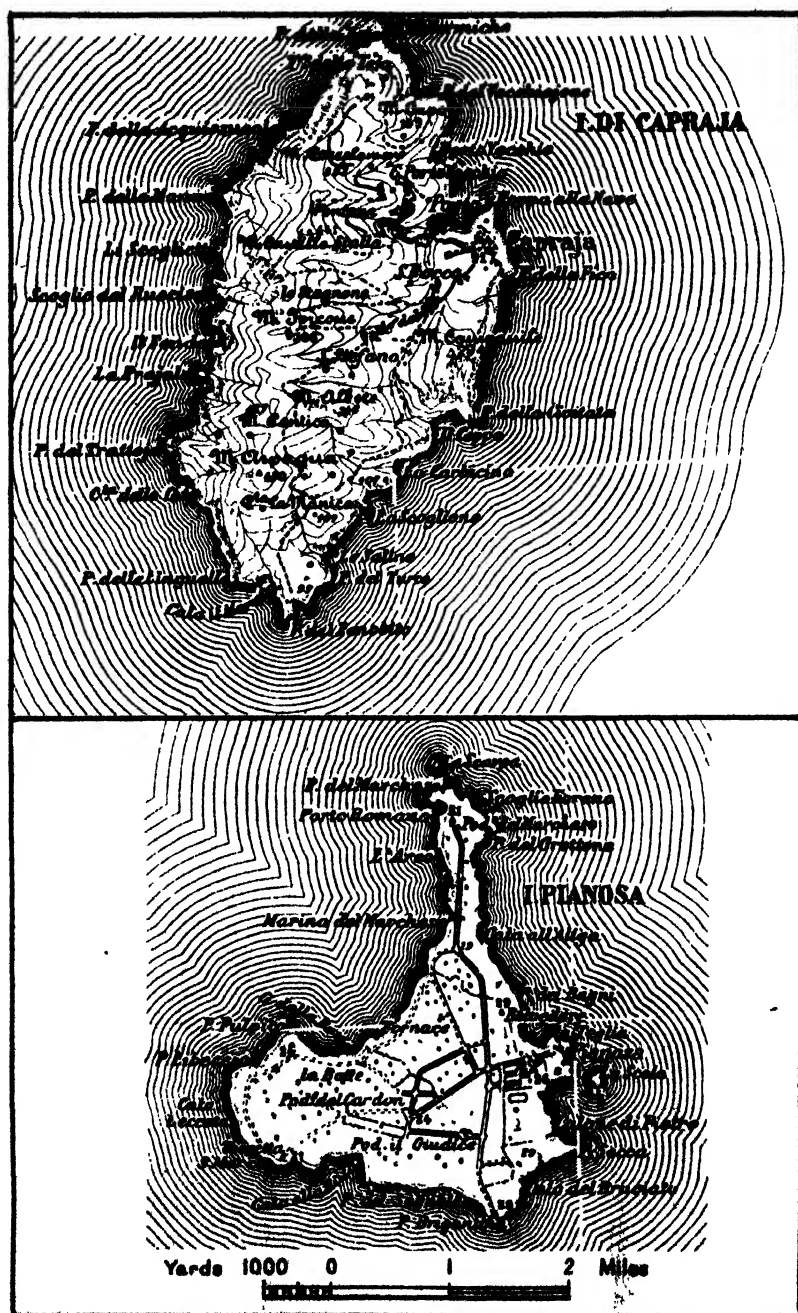


FIG. 59. *Capraia and Pianosa*

Another cove, the Cala Martina, also on the east coast, has at its head a small stream and the laundry of the local penal colony.

Only about 280 people live on Gorgona and the majority of these are convicts, who are lodged in buildings on the hills above the north shore of Cala dello Scalo and in a small colony on the south-west of the island.¹ The few free islanders are mostly fishermen, who dwell in a group of small red cottages near the shore of Cala dello Scalo. The east side of Gorgona is cultivated by convict labour. The seas around the island are rich in fish, especially anchovy, and from April to June fishermen from the adjacent mainland congregate here. A steamer service calls twice a week from Leghorn, to which Gorgona is also connected by a submarine telegraph cable.

CAPRAIA (CAPRAJA)

Isola di Capraia is situated about 18 miles east of the northern extremity of Corsica and 40 miles south-west of Leghorn. In shape the island is an ellipse with axes of 5 miles and $2\frac{1}{2}$ miles and an area of $7\frac{1}{2}$ square miles (Fig. 59). It is entirely volcanic in structure, the predominant rocks being andesites, except near Capraia village and Point Zenobito, where tuffs and breccias are common. A mountainous ridge traverses the island from north to south, keeping within a few hundred yards of the west coast. The crest of this ridge is serrated but seldom falls below 1,200 feet or rises above 1,400 feet. Among the prominent peaks are Monte Castello (1,476 ft.), in the north and Monte Arpagna (1,345 ft.) in the south. The western slopes of the ridge are rocky and precipitous; the eastern drop gently to the sea, the only notable interruption being the steep hillock of Monte Campanile (994 ft.). The flattest areas on the island are the gently undulating platforms, at 170 to 300 feet above sea-level, near Capraia village and Point Zenobito. A slightly lower platform, likewise a marine terrace, occurs on the triangular headland of Poppa alle Nave. The steep western declivities of Capraia are furrowed by small gorges, whereas the eastern slopes are crossed by several streams which flow for the most part in open valleys. Midway along the mountain ridge Lake Stagnone occupies a shallow enclosed basin, 120 yards long by 60 yards wide, at about 1,053 feet above the sea. The lake rises during rainy periods and overflows into the Vado del Codolone, but in time of drought its waters, never more than 14 feet deep, dwindle and may practically dry up. The water-supply

¹ The 'resident' population was 138 in 1938.

of Capraia is adequate to meet the needs of the few islanders, but the rains do not support a luscious vegetation. Most of the island, apart from the frequent exposures of bare rock, carries a low growth of dull green bushes, among which cistus, rosemary, myrtle, heath, mastic, and bilberry are common.

Since the coast on the western side is rocky, steep, and barren, landing places are restricted to the east, and especially to the bay between Point Porto Vecchio and the headland of Poppa alla Nave (Point Feraione). At the head of this bay two moles help to shelter a small harbour in which are depths of 4 to 14 feet. In addition, on the south-eastern side of the bay, there is a landing-place for boats protected by a short breakwater.

The population of Capraia decreased from 551 in 1921 to 341 in 1938. Nearly all of the free islanders live in the village on the marine platform east of the main harbour. Here the buildings are clustered within sight of the sea. On the east of the village, overlooking the shore, is the Castello di S. Giorgio, an ancient and solidly built fort, surmounted by modern buildings with a tall cylindrical watch-tower (Plate 70). Westwards the houses of the village, some of them empty and dilapidated, stretch along the cart-road that descends to the harbour. A penal establishment is situated in the hills north-west of the harbour. Very little of Capraia has been brought under cultivation, although the penal colony has long supplied agricultural workers. Small quantities of corn, barley, olive-oil, and wine are produced on cultivated patches which are surrounded by high stone walls to keep out stock. The chief vineyards lie in the valley between M. Campanile and the main mountain ridge. Many levelled patches, formerly cultivated and since abandoned, have been invaded by scrub; much of this abandonment was probably due to overgrazing by the small, black cattle that are characteristic of the island's stock. The inhabitants partake in the tunny fisheries of this archipelago, nets being set off shore in the neighbourhood of Point Porto Vecchio. Porto di Capraia has a twice-weekly steamer service with Leghorn and the other islands of the group, and is also a port of call for some Genoa-Palermo sailings. A submarine cable gives telegraphic communication with Elba and so to the mainland.

PIANOSA

Isola Pianosa lies about 8 miles south-south-west of the nearest point of Elba. A small triangular island with greatest measurements

of $3\frac{1}{2}$ miles from north to south and of $2\frac{3}{4}$ miles from east to west, it has an area of 4 square miles (Fig. 59). It comes within the commune of Campo nell' Elba, which is part of the province of Leghorn. The surface consists almost entirely of soft shelly limestones resting in parts on marls, all of recent geological age. The softness of the rocks has favoured the natural formation and artificial excavation of caves, many of which were used by prehistoric man. These caves have yielded a great abundance of remains, including the bones of bear, wolf, deer, and horse, which prove a continental connexion as late as Quaternary times. Some of the caves are catacombs with several branches. The surface of Pianosa is flat or gently undulating and is nowhere higher than 95 feet. The scanty rains and porous rocks cause a lack of surface water. The water-supply comes mainly from wells, some of which were dug in Roman times, and to a lesser extent from cisterns. The coasts are low, but for the most part rocky and cliffed. Near the middle of the east coast there is a beach of fine white sand at the head of the Cala S. Giovanni. A small harbour, the Porticciuolo di Pianosa, lies at the southern entrance point to this bay. The harbour, which has depths of about 6 feet and is available for small craft, is protected on the north by a mole and on the east by a breakwater, part natural and part artificial. La Scola, an islet 111 feet high, rises from the sea about half a mile south-east of the harbour. On the south coast of Pianosa, landing can be made at the head of the Cala alla Ruta.

In 1938 there were 912 people living on the island, which has been used as an agricultural penal colony for nearly a century. The only village is near the port at the head of Cala S. Giovanni. It has battlements, which, together with the arched windows and brightly painted buildings, give it a striking appearance from seaward. In other parts of the island there are a few isolated houses, including Belvedere, a circular building with two rows of arches, just east of which a masonry obelisk marks the site of extensive Roman remains. The soils of Pianosa are fertile and agriculture flourishes in spite of the long summer drought. Over one-tenth of the island is under vines, and another two-tenths under maize, barley, rye, oats, legumes, and forage crops. The vine, cactus, agave, and olive flourish, the last-named growing to a considerable size. The uncultivated parts of Pianosa are mainly covered with macchia of a fair height and with scattered trees. The island has a twice-weekly steamer service to Leghorn and the other islands of the archipelago, and is connected by a submarine cable to the mainland telegraph system.

MONTECRISTO

The small island of Montecristo is situated 16 miles south-east of Pianosa and 31 miles east of Corsica. It consists of a mass of granite, rectangular in shape and with a surface area of nearly 4 square miles. The island has a rough, wild aspect especially in its north-eastern parts, where Picco del Segnale rises to 2,126 feet. The coasts are steep and precipitous, the only easy landing being at the small mole in Cala Maestra on the north-west side of the island. Montecristo is a royal game preserve, and its only inhabitants are a caretaker and two or three families in the employ of the Royal Household. There is a royal palace at the head of Cala Maestra. Apart from a thin covering of *macchia* and a few small patches of vine, the island is barren and the people obtain their supplies from Civitavecchia. At various times in the past Montecristo has been the home of a monastery, the haunt of bandits and of smugglers, the seat of a penal colony, and the residence of several eccentric plutocrats, some of whom unsuccessfully attempted agriculture and others introduced wild beasts. It was mainly the very ancient monastery, now in ruins, that gave rise to the numerous legends which were told by Pier Angelo Fiorentino to Alexander Dumas who wove them into his famous romance. To-day landing is prohibited and there are no regular steamer communications. A submarine telegraph cable links the island with Pianosa.

GIGLIO

Isola del Giglio lies about 26 miles east of Montecristo and 8 miles west of the promontory of Monte Argentario. Apart from a large headland on its west coast, it is elliptical in shape, with a length of $5\frac{1}{2}$ miles and an area of nearly $8\frac{1}{2}$ square miles. It forms part of the province of Grosseto.

Giglio consists entirely of granite, except for part of the Faraglione headland on the west coast, where a limestone bed overlies a serpentine base. The relief is mountainous and rises in the centre of the island to 1,634 feet at Poggio della Pagana. The coasts are, for the most part, high, steep, and clear of dangers. Landings are usually made at Giglio Porto (Giglio Marina) which is situated near the middle of the east coast. Here a small cove protected by two moles forms a harbour, with depths of 13 feet, suitable for small vessels. Outside the harbour the depth increases too rapidly for anchorage. On the north-western coasts of the island the Gulf of Campese has on its



PLATE 69. *The Fosso di Marciana, Elba*

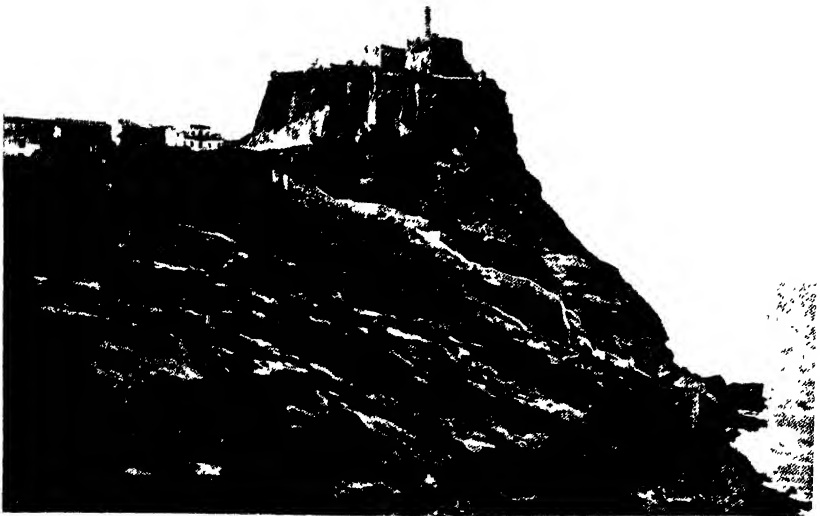


PLATE 70. *Castello di S. Giorgio, Capraia*



PLATE 71. *Castello d'Ischia*

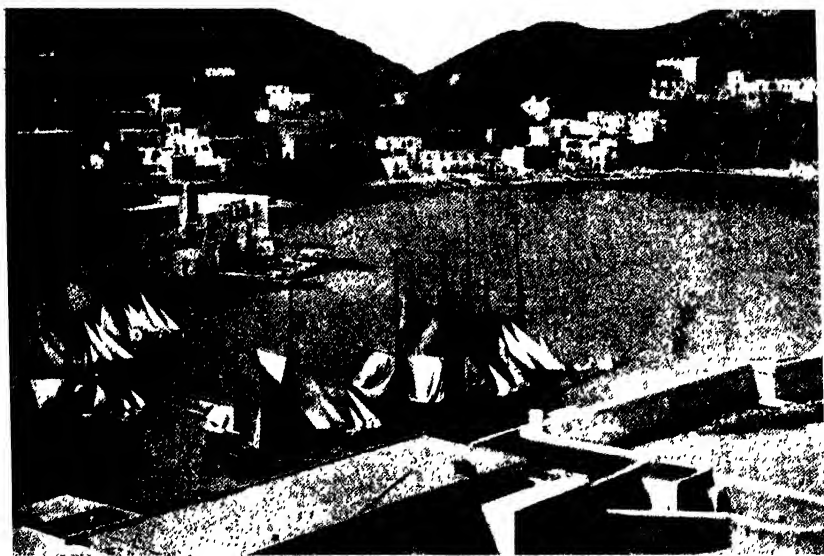


PLATE 72. *The town of Ponza (left) and village of Santa Maria (right)*

south-eastern side a sandy beach divided into two stretches by a flat rocky promontory. This bay affords anchorage in 4 to 8 fathoms while the little cove north of the tower on the promontory makes a good landing-place for small boats. Landings may also be effected alongside a rough mole in Cala Cannelle, which lies a short distance south of Giglio Porto, and at a natural quay in Cala Saracinesca in the extreme south-east of the island.

Of the 2,143 inhabitants of Giglio, only 90 live in isolated country cottages; all the others dwell in the two villages of Giglio Porto and Giglio Castello, which are connected with each other by a track. The former, near the shore of the harbour, had 1,040 inhabitants in 1938; the latter with 1,013 inhabitants is situated at 1,335 feet on the mountain backbone north-west of the port. It is called Giglio Castello since it consists mainly of a large well-girt fortification, built and paved of granite, with straight corridors crossed by archways. Most of the islanders live by fishing and farming. The fishermen work from Giglio Porto and catch mainly sardines. The farming areas are not extensive; the main cultivation is the vine, but small quantities of maize, olives, chestnuts, and figs are also produced. The uncultivated parts of the island bear a scrub-growth of cistus, buckthorn, mastic, myrtle, and heather, with a scattering of pine, ilex, and arbutus. The foliage of some of these woody plants and the presence of a little fodder allow the keeping of a few cattle and fair number of goats. In addition, granite and alum are quarried, the former near the port, and the latter high up on the eastern side of Cala dell' Allume on the west coast. Giglio has a steamer service 6 times a week to Porto S. Stefano on the Italian mainland and is joined by submarine cable to the mainland telegraph system.

GIANNUTRI

The islet of Giannutri, the southernmost of the Tuscan archipelago, lies $8\frac{1}{2}$ miles south-east of Isola del Giglio. It is a crescent-shaped island, convex to the west, with a length of nearly $1\frac{3}{4}$ miles and an area of 1 sq. mile. The rocks are of limestone, of a spongy nature, which form an escarpment running the length of the crescent. This ridge rises to 305 feet at Point Mezzogiorno in the south, whence it declines northwards to 272 feet at Point Cannone and to 236 feet at the hill of S. Francesco. Parts of the island adjoining this ridge are less than 100 feet above the sea. The people depend for water-supply on rain-water stored in cisterns. The coasts of Giannutri are rocky

and steep-to except for a spit extending about 100 yards from the northern extremity. In fine weather small craft can use Cala Maestra, a cove with rocky shores on the north-west coast; in addition, on the south-west coast there are landing-steps cut in the rock a little westward of Point Calettino. In Roman times the island was the site of a palatial villa, numerous remains of which are still visible. The population in 1921 was only 5 persons, but recent developments in agriculture have increased this number. The few inhabitants live near Cala Maestra where small patches of vine, olive, and market-garden crops are grown. The only steamer connexions are occasional visits from Porto Ercole, 10½ miles to the north-east on the promontory of Monte Argentario.

THE PONZA ISLANDS

THE Isole Ponziane or Isole Pontine lie in the Tyrrhenian Sea southward of Cape Circeo and west-north-westward of Naples. The archipelago is composed of five islands and numerous rocks, which fall naturally into a north-western group, consisting mainly of Palmarola, Ponza, and Zannone, and a south-eastern group formed of Ventotene and S. Stefano. The two groups are separated by a channel about 24 miles wide. The islands are the exposed fragments of vast submerged volcanic cones and craters, and although showing no active signs of vulcanism, are often affected by slight earth tremors. Their total area is less than 4½ square miles and their population barely 8,000 persons. The archipelago forms two communes of the province of Naples and part of the diocese of Gaeta.

PALMAROLA

Isola di Palmarola, the westernmost of all the Pontine islands, consists of a narrow ridge of volcanic rock stretching about 1½ miles from north to south and varying in width from 400 yards to 880 yards. Although the island only covers 300 acres, its surface rocks range from lavas (liparite) on the higher and northern parts to tuffs and pumice on the lower areas, and to the shelly marine deposits of a terrace in the north-west. The ridge of the island is divided by low cols into three hill-blocks, a northern rising to 771 feet in M. Tramontana, a central to 702 feet in M. La Radica, and a southern to 860 feet in M. Guarnieri. The coast, 5 miles in length, is high,



FIG. 60. Ponza and Ventotene

irregular, and generally difficult of access, the only anchorage and easy landing-place being in the Cala del Porto, a small cove with a sandy beach on the north-west side of the island. In several places the coast is fringed with rocks that are for the most part low except off the south-western extremity, where the Scoglio di Mezzogiorno rises to 348 feet. Palmarola has no springs, and, apart from a little low *macchia* and one fig tree, has practically no natural vegetation. The island is only inhabited in spring and autumn when ten or a dozen people come from Ponza to cultivate the vineyards on the slopes above the Cala del Porto. These cultivators live in cave-dwellings cut in the tuffs near the landing-place.

PONZA

A channel, $4\frac{1}{2}$ miles wide, separates Palmarola from Isola di Ponza, the largest and most populous of the Pontine group (Fig. 60). The island is a crescent-shaped ridge of volcanic rock, with a length of about 5 miles, a width of from 230 yards to 2,000 yards, and an area of $2\frac{3}{4}$ sq. miles. The lower parts of the surface consist mainly of tuffs and the higher of lavas, which are liparites except in the south where the M. della Guardia mass is composed of trachites (andesite). Some of the tuffs, especially north of the Cala Chiaia di Luna, are brown and sandy, but most are whitish, the white colour being especially noticeable near the Cala d'Inferno. Among the minor rock-coverings are the marine deposits forming terraces south of the Porto di Ponza and inland from the Cala dell' Acqua. The only springs on the island, or indeed in the whole archipelago, are near the shore of the Cala d'Inferno and the Cala dell' Acqua; elsewhere the drainage slopes are too small and too precipitous to yield springs. The relief of Ponza much resembles that of Palmarola. Two narrow waists divide the crescentic ridge into three hill-blocks, a northern rising to 512 feet in M. Schiavone, a central to 669 feet in M. Core, and a southern to 928 feet in M. della Guardia. Since none of these summits is more than a few hundred yards from the sea, the coast of Ponza is for the most part high and steep. Many of the cliffs exceed 300 feet and those just west of M. Faraglione are 550 feet in height. The coastline is deeply indented, its total length being about 13 miles. On the west coast three main bays—the Cala dell' Acqua, Cala Feola, and Cala Chiaia di Luna—afford temporary anchorage for small vessels except when the wind blows directly onshore. On the east coast landing-steps have been cut near a natural quay at the head

of the Cala d'Inferno, but the main landing-place is farther south in the Cala di Ponza. Here, on the south side of the bay, the Porto di Ponza is protected from northward by a mole which has quays on its inner side and stone mooring-posts. At its head are landing-steps with 13 feet of water alongside. Further protection is given by a breakwater which has been constructed close northward and more or less parallel with the mole. The eastern side of the port is quayed and has stone mooring-posts. The depths of about 20 feet in the centre of the harbour decrease to about 9 feet at a few yards from the quays and those on the inner side of the mole.

In 1938 the population of Ponza island was 6,500, or over 2,200 people to the square mile. The majority of these dwell near the south and east shores of the Cala di Ponza, where the town of Ponza has 3,000 inhabitants (Plate 72). On the north shore of this bay is the village of Santa Maria, which stands on the site of a large Roman settlement. About 1,700 people live in isolated houses, built on the slopes of the hills, or in some areas, as near Forni, excavated out of the tuffs. In spite of its already great density the population is still increasing and the island is still used as a penal colony. Most of the islanders obtain a living from fishing, agriculture, and wine-making. The vine is by far the chief crop; it is grown on carefully constructed terraces, which in places rise in flights of 100 steps from the shore right to the hill-crest. The minor crops include wheat, a little flax (for providing vine-ties), and some lupine, the latter being planted as an inter-cultivation in spring. Although Ponza exported timber and wood in the Middle Ages, to-day it has no forests, and the main vegetation, apart from crops, consists of the agave, the prickly pear, and a low growth of yellow broom which afford a little fodder for goats and a shelter for migratory birds. The fishing industry flourishes, the main catch being anchovy, sardine, and various crustaceans, especially lobsters. In addition there is a small mining industry, bentonite, a very fine powder formed by the decomposition of lava, being mined and quarried at Cala dell' Acqua, where it is treated in a plant with a capacity of 300 tons a day. Loading jetties with a capacity of 200 tons a day have been specially built on the shores of the bay for the export of the product to Gaeta. The mines have been in production at least since 1935, and the reserves are estimated at 7 million tons. The chief uses in Italy of bentonite are in the textile, paper, and plastic industries, and, above all, in steel plants, foundries, shipbuilding yards, and oil refineries.

The communications of Ponza include a road from Porto di Ponza northwards along the hill-crest to the Cala Gaetano, and a track or cart-road to the radio-station (telegraph) on M. della Guardia. Submarine cables land at the beach of Sta. Maria near the main port, and there are in summer steamer services twice a week from Naples and throughout the year four times a week from Gaeta.

ZANNONE

The Isola di Zannone lies about $3\frac{1}{2}$ miles north-east of Ponza, with which it is connected by a submarine ridge that rises above the sea in several places. The island is oval-shaped, its greatest measurements being nearly 1 mile by $\frac{3}{4}$ mile. The surface, which covers only 200 acres, consists of lavas (liparite), except in a narrow strip near the north-east coast where the underlying sedimentary rocks are exposed. The summit of the island is in the north at M. Pellegrino (604 ft.), whence the land slopes gradually southwards. For the most part the coasts (3 miles in length) are steep and little indented. Landings can be made in the extreme north on either side of Cape Negro, or at a small cove just north-west of Point Varo, the south-western extremity of the island, where there is a small quay with 3 feet of water alongside. Zannone has no permanent inhabitants except the lighthouse keepers. Parts of the island are covered with low bushes; a few prickly pears and vines in the south-west are the only signs of attempted cultivation.

VENTOTENE

Isola di Ventotene, the larger of the two islands forming the south-eastern group of the Pontine archipelago, is the unsubmerged fragment of a crater rim. It has a length of about $1\frac{3}{4}$ miles, a width of from 300 yards to 930 yards, and an area of 340 acres (Fig. 60). The basalt base of the island is exposed only in the coastal cliffs; elsewhere the surface rocks are formed of tuffs, which, in the north, are overlain by marine sediments. The island's highest point is Monte dell' Arco (436 ft.) in the extreme south-west, whence the land slopes fairly regularly northwards to a height of less than 50 feet near Point Vevola. The coasts are rocky, little indented, and difficult of access except in the north. The main landing-place is at Porto Nicola on the north-eastern side of the island, where a harbour was excavated in Roman times in the headland immediately south of Cala Rosano.

To-day a rocky promontory lined with masonry forms the northern and eastern sides of the harbour. The entrance to Porto Nicola faces eastward and is funnel shaped, its width narrowing to about 100 feet at its inner end; the depths in this channel decrease from 20 feet in the centre to between 10 and 13 feet at the sides. Opposite the inner end of the entrance is the Puzillo, a kind of basin with depths of about 7 feet. The western side of the harbour is quayed, with depths of 10 to 13 feet alongside. But a rock with only 6 feet of water over it lying close within the inner end of the entrance limits access to the quays to vessels drawing 4 feet or less. Consequently landing and boarding is done by means of boat. When strong easterly winds make it impossible to enter Porto Nicola, mail steamers call at Cala Parata Grande on the north-western side of the island.

The population of Ventotene numbers about 1,200 persons, of whom all but a few score live in the village facing the harbour. The island has been densely peopled since Roman times, when it seems to have been a favourite place of exile for unruly daughters and unwanted wives. Hither Augustus relegated his daughter Julia and Nero his divorced wife Octavia. To-day the density of population exceeds 2,300 people to the square mile and is still increasing. The gently sloping surface of Ventotene lends itself well to agriculture. The vine greatly predominates amongst the crops and the prickly pear is second in importance. The island has a regular steamer service twice a week to Gaeta and twice a week in summer to Naples. The telegraph cable from the mainland lands at Cala Parata Grande.

SAN STEFANO

The most easterly and smallest of the five main Pontine islands is S. Stefano, which rises from a submarine ridge at a distance of 1 mile from Ventotene. The islet is oval shaped with a greatest length of 800 yards, a greatest width of 500 yards, and an area of about 74 acres. Its base consists of phonolitic lavas, above which are stratified tuffs, capped in the centre and south by a flattish layer of marine deposits. The island on all sides slopes gently seawards from a central height of 223 feet at Ergastolo. The coasts are steep and rugged except near Marinella in the north-west, where a quay with steps, alongside which small boats can berth, forms the island's best landing-place. Other landing-places, also with stepped pathways leading inland, occur near Point Falcone in the north and Point Spasaro in the south-east. Most of the 190 residents of S. Stefano

obtain a living from the cultivation of figs, American agaves, and prickly pears, all of which flourish. The steamship service from Naples to Ponza calls twice a week in summer.

THE ISLANDS NEAR NAPLES

ISCHIA

Ischia lies north-west of the entrance to the bay of Naples at a distance of $7\frac{1}{4}$ miles from Cape Miseno, the nearest point of the mainland, and 17 miles from the port of Naples. The island covers nearly 18 sq. miles and has a greatest width (north-south) of $4\frac{1}{2}$ miles, and a maximum length (east-west) of about 6 miles (Fig. 61). For administrative purposes it forms six communes of the province of Naples.

Geology and Relief

Ischia consists almost entirely of volcanic rocks, but the lava-flows are in most parts covered by tuffs. In addition, patches of marly deposits containing marine fossils occur on some of the hill-sides at about 1,600 feet. In Roman and later times the island experienced several severe eruptions, but no eruption has occurred since A.D. 1302 when a stream of lava (Lave dell' Arso) flowed from M. Rotondo to the sea near Point Molina, the north-eastern extremity of Ischia. Signs of present volcanic activity are restricted to hot springs and fumaroles. The chief hot springs are at Ischia, Porto d'Ischia, Casamicciola, Lacco Ameno, Forio, and Serrara Fontana; fumaroles exist in the north at the Stufe di S. Lorenzo west of Lacco Ameno, and in the south near S. Angelo. Near the latter village on 30 July 1939 a geyser burst from the shore sending a violent jet of steam and water up to a height of 57 feet; the eruption was repeated at intervals of 3 to 5 hours for a week; the temperature measured 280° F., and one explosion was so violent that it hurled the thermometer into the air and put the observers to flight. In the past parts of Ischia were liable to earthquakes, but a few slight tremors only have been experienced since 28 July 1883, when Casamicciola was practically demolished and 1,700 people were killed.

Ischia is hilly, but only its central parts are mountainous. The summit area at M. Epomeo (2,588 ft.), just north-west of the centre of the island, consists of twin peaks which drop precipitously northward and fall relatively gently on all other sides. The view from the

summit embraces the Ponza islands, Procida, the bays of Gaeta and Naples, Vesuvius, and, far to the north, the peaks of the Abruzzi. M. Epomeo forms the northern part of a much-eroded crater-rim which encircles Fontana and extends arcwise to the peninsula of S. Angelo in the south and to M. Tribbiti (1,644 ft.) in the east. The flanks of this circular mass are dotted with smaller craters, among which are Montagnone (837 ft.) and M. Rotaro (1,005 ft.) in the north-east, the promontory near Lacco Ameno in the north-west, and the ridge of Campagnano (1,234 ft.) in the south-east. The rocky islet on which the Castello d'Ischia stands and similar steep-sided hillocks elsewhere also probably originated as small volcanic vents.

Coast and Ports

Although 21 miles long, the Ischian coastline possesses only one good harbour. The west coast from Point Caruso to Point Imperatore, a distance of 4 miles, is bordered for much of its length by underwater dangers. The mail steamer calls at Forio, where the harbour is formed by a mole extending north-north-eastwards. This mole is quayed, but is so much affected by silting that it can only afford shelter to small craft until the long-proposed improvements are completed. The south coast of Ischia is lacking in harbours and does not give direct access to the main road-network. The eastern coast is equally deficient except in the north near the town of Ischia, where a causeway connects the rocky Castello islet to the mainland. This causeway is pierced by a boat-passage and has near its root a rectangular quay capable of accommodating a few small craft.

On the north coast of the island, about 1 mile north-west of Ischia town, is Porto d'Ischia (Villa dei Bagni; Plate 73). This harbour consists of a circular crater-lake to which an entrance from the sea was excavated in 1856. A curved mole extends about 820 feet west-north-westward from the western entrance-point and terminates at a lighthouse. The harbour, which has a diameter of about 1,400 feet, has depths of 13 to 16½ feet at its centre and of 9 to 13½ feet close to the quays on its south-eastern side. It can accommodate vessels up to 230 feet long and 13 feet in draught, and is sheltered from all winds, although those from the north-east may raise a surf. The port has little trade apart from the export of wine and the tourist traffic. The mail steamer from Naples also calls at Casamicciola, where there is a pier, and at Lacco Ameno, which has a small masonry mole, lined with quays, with a depth of about 7 feet alongside its eastern end.



PLATE 73. *Porto d'Ischia*



PLATE 74. *Marina Sancio Cattolico, Procida*



PLATE 75. (Upper) Procida with Ischia island in the distance ; (Lower) Procida, the Castello

Climate, Vegetation, and Water-supply

The climate of Ischia is genial, the humidity being low, snow and hail rare, and sunshine plentiful. The sea winds temper the heat of the summer half-year and make the island a favourite holiday resort. Most of the island is covered with verdure. Terraced vineyards and orchards predominate, but on the steeper and rougher areas, such as the summit of Montagnone and on the Arso crater near Fiaiano, groves of pine have been planted. The supply of water is sufficient for the people's needs. Cisterns are general, but springs occur on the upper flanks of the main upland mass, especially near M. Epomeo. From the southern slopes of M. Tribbiti a piped supply (mostly underground) is taken to Villa dei Bagni and to the neighbourhood of S. Michele, just south of the town of Ischia.

Population

In 1938 Ischia had a population of 30,418 persons which slightly exceeded that of Elba, an island five times as large. This population continues to increase at the rate of nearly 1 per cent. a year, although the density has already reached 1,700 people to the square mile. The number of inhabitants of each of the six communes and of the villages after which they are named is given in the following table:

<i>Name of commune</i>	<i>Population (1938)</i>	
	<i>Chief village</i>	<i>Commune</i>
Ischia	2,858	9,252
Casamicciola	1,931	4,086
Lacco Ameno	1,423	1,848
Forio	3,007	6,415
Serrara Fontana	1,209	2,292
Barano d'Ischia	845	6,525

The distribution of settlements on the north side of the island differs considerably from that on the south; on the north most of the people congregate in coastal villages, whereas on the south they mainly inhabit the hill-slopes at 700 to 1,500 feet above sea-level. Ischia, or Ischia Ponte, the capital of the island and seat of a bishopric, is on the north-east coast. Its buildings stretch along the shore in the form of one street nearly a mile long. The Castello is situated at about 300 feet on a rocky islet (Plate 71), connected to the south-eastern part of the town by a stone causeway, 250 yards long. The castle, originally built about 1430-1450 for Alfonso I of Aragon, is half-ruinous but is much visited for its view of the gulf of Naples. Porto d'Ischia, about 1 mile north-west of the capital, has about

2,900 inhabitants, and derives much of its importance from its large thermal baths. About $1\frac{1}{2}$ miles farther west is Casamicciola, a much-frequented spa and sea-side resort; the village consists of a lower quarter (Marina) near the shore and an upper quarter (Bagni, 154 ft.) which contains the thermal baths. The adjacent villages of Perrone and Maio-Sentinella each have about 1,000 inhabitants. Lacco Ameno, the main village of the north-west coast of Ischia, also has thermal baths. The chief settlement on the west coast is Forio, a large village with thermal springs and a considerable wine-making industry. The settlements of the southern slopes of Ischia are small and their buildings are so loosely grouped that the villages can scarcely be distinguished from the numerous isolated houses in their neighbourhood. The houses of Serrara (1,200 ft.) straggle northwards along the main road to Fontana (1,480 ft.); Barano d'Ischia (710 ft.) is a village of only 845 inhabitants, surrounded by numerous cottages dispersed amid vineyards and orchards; at Piedmonte 559 people live in the village and 1,783 persons in isolated dwellings in its vicinity.

Industries

The soils derived from the volcanic tuffs are extremely productive and have been preserved from downwash by careful terracing. The main crop is the vine, which is used almost entirely for making a white wine that sells readily in the Naples area. Terraced vineyards step the hill-sides on all but the highest and roughest parts of the island. In addition, a wide variety of other fruits and of vegetables is grown. The fishing industry is carried on mainly from the north coast villages; the catch includes tunny for which fixed nets are set off Lacco Ameno. The tourist industry is of great importance and is well catered for; the main spas and sea-side resorts are Casamicciola, Forio, Ischia, Villa dei Bagni, and Lacco Ameno. Henrik Ibsen wrote *Peer Gynt* when staying at Casamicciola in 1867.

Communications

A good motor-road runs from Ischia to the main villages on the north and west coasts. South of Forio the road keeps along the lower hill-slopes as far as Cuotto, where it turns inland and follows a devious, hilly route across the southern slopes of the island. It serves all the main villages which here lie at altitudes of between 700 and 1,500 feet and at a distance of between $\frac{1}{2}$ mile and $1\frac{1}{2}$ miles from the coast. Near Molara the road turns north-eastwards and so completes a circuit of 20 miles. Various secondary roads and cart-tracks

branch off from this main motor-route; the highest parts of the M. Epomeo hill-mass and the steepest slopes of volcanic craters elsewhere are reached only by tracks. Motor-coach services run between the larger villages on the main road. All the chief settlements have a telegraph service and most also have telephones, the network being connected by submarine cable to the mainland. Ischia and the coastal villages as far west as Forio have frequent daily steamship services with Naples and Torregaveta.

PROCIDA

A channel $1\frac{1}{4}$ miles in width separates the Castello d'Ischia from Isola Vivara, the southern part of Procida; the latter island is separated from the mainland by the Canale di Procida, which is just over

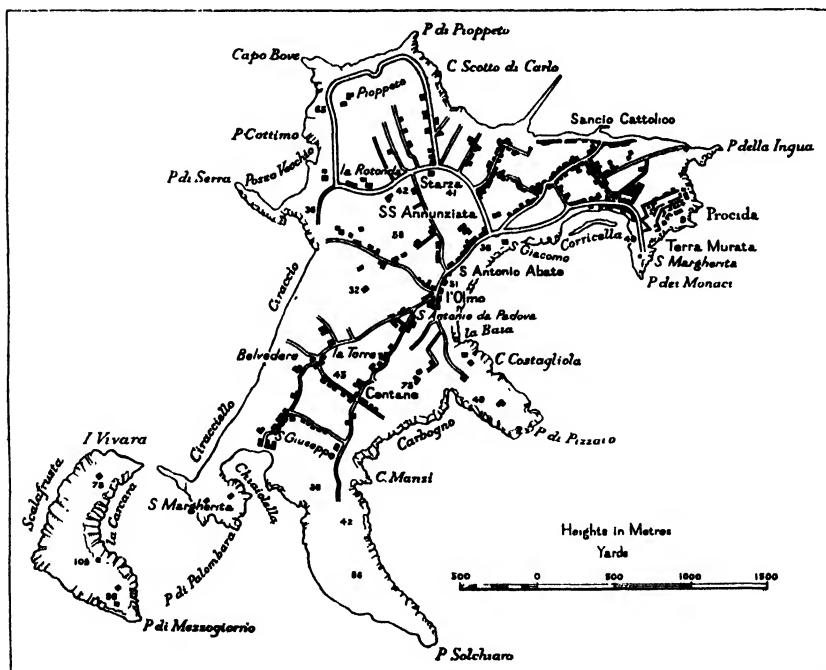


FIG. 62. *Procida*

$1\frac{1}{4}$ miles wide. Procida has an irregular shape; its width varies between $\frac{1}{2}$ mile and $1\frac{1}{2}$ miles, its maximum length (north-east to south-west) is $2\frac{1}{4}$ miles, and its area about $1\frac{1}{2}$ sq. miles (Fig. 62). The

island consists mainly of yellow tuffs overlain by grey tuffs, which are for the most part trachytic and pumiceous. The surface is relatively flat, the highest point (377 ft.) being at the north-eastern extremity. Four craters can be distinguished: two large contiguous craters, partly submerged, form two semicircular bays on the south-east coast; a third and smaller crater forms the creek of Chiaiolella in the south-west; the remnants of a fourth crater are visible in the semicircular bay between Point Serra and Point Cottimo on the north-western coast. The crescent-shaped islet of Vivara is the unsubmerged fragment of a fifth crater. The greater part of Procida lies at 100 to 150 feet above sea-level, whereas Vivara is mainly over 200 feet and has a summit height of 358 feet. The two are separated by a passage about 130 yards wide and up to $13\frac{1}{2}$ feet deep. Although the coastline of Procida is 10 miles long it has few good landing-places. In the cove east of Point Palombara the small fishing harbour of Porticciolo della Chiaiolella has been formed by two moles which afford shelter to small craft during south-easterly winds. On the north coast the main landing-place is at Sancio Cattolico, or Marina di Procida, where a mole extends about 400 yards north-north-east from the shore. In addition, from the middle of the quay at Marina, facing the church of S. Giovanni, a small mole has been built parallel with and close to the coast, to which it is connected at its western end only. At the east of the Marina a wooden pier extends seawards. On the east coast of Procida the main anchorage is the Cala di Corricella, a creek west of Point Monaci used by mail steamers when northerly winds hinder landing at Sancio Cattolico. In this creek a breakwater has been constructed just off the beach to protect some coastal houses from rough seas, but only small boats can find shelter behind it.

In 1921 Procida had 10,690 inhabitants, or nearly 7,300 persons to the square mile, a density which inevitably led to a decline, so that by 1938 the population had dropped to 9,452 persons. Houses are dispersed among vineyards over most of the island except Vivara, but the only large village is Procida, where the dwellings stretch along the Sancio Cattolico (Plates 74, 75) and thence south over higher ground to the Cala di Corricella. Most of the buildings have flat roofs and are white in colour. The most conspicuous structure is the castle on the precipitous north-eastern headland, which is used as a house of correction. The islanders live mainly by cultivating the vine, other fruits and vegetables, and from the tourist industry. A good deal of fishing is done, fixed nets being set for tunny off the

[illegible]

FIG. 63. Capri

neighbourhood of Belvedere on the west coast. The island is well served by motor-roads and cart-tracks. The Strada Vittorio Emanuele traverses the length of the island and runs between an almost continuous belt of houses and garden-walls. There are telephone and telegraph communications with the mainland and steamers call daily from Naples and Torregaveta.

CAPRI

Of all the minor Italian islands, Capri is the most visited and most cosmopolitan. It lies barely 3 miles west-south-west of Point Campanella, the nearest point of the Sorrentine peninsula, of which it is a structural continuation. The island is about $3\frac{3}{4}$ miles long, from $\frac{1}{2}$ to $1\frac{3}{4}$ miles broad, and covers an area of 4 sq. miles (Fig. 63). Most of its surface consists of a compact, grey or bluish limestone, which, except in small pockets, lacks stratification. In parts the limestone is covered with younger deposits and especially with tuffs blown from neighbouring volcanoes. Physically the island may be divided into a high, western limestone mass and a hilly eastern ridge. The former lies west of a line from Point Mulo to Point Trasele, and consists of a calcareous block rising to 1,919 feet in M. Solaro in the east and dropping gradually to less than 600 feet in the west, where it is incised by several small valleys. The eastern region consists mainly of four high hills connected by cols and saddles; the summits, from east to west, are Sta. Maria del Soccorso (1,161 ft.), M. Tuoro (870 ft.), S. Michele (817 ft.), and Castiglione (820 ft.). The hills drop abruptly to the sea, especially in the east, where some of the cliffs are 900 feet sheer. Most of the coast of Capri, $7\frac{1}{2}$ miles in all, is cliffed and in parts have been eroded by the sea into caverns, natural arches, and isolated stacks. The most famous cavern is the Blue Grotto (Grotta Azzurra), which is situated 750 yards eastward of Point Vitarota. The entrance is barely 3 feet high and can be entered only by small boats; the interior is about 175 feet long, by 98 feet wide and 50 feet high. The water, which is 50 feet deep, gives objects immersed in it a silvery appearance. Access inland is usually difficult or impossible. There is a small harbour at Marina Grande, the port of Capri. It is formed by two moles and is well sheltered, although north-westerly winds sometimes raise a sea in it. The main or western mole, which projects from abreast the village near the foot of the funicular railway, extends about 200 yards north-eastward and then eastward for 250 yards. The second mole

extends 100 yards from the shore about 350 yards east of the root of the first mole. The inner side of the main mole is quayed and can accommodate two vessels up to 23 feet in draught and of an aggregate length of 325 feet, one vessel lying alongside and the other at right angles. Small craft lie in the inner part of the harbour. When a strong easterly or north-easterly wind is blowing steamers sometimes anchor off Marina Piccola on the south side of the island.

The vegetation of Capri is of great interest as the indigenous flora comprises 800 species, mostly of Mediterranean shrubs and bushes. The limestones and small catchment areas prohibit streams and there are no springs, although in wet winters some water seeps from the rocks on the north side of the island near Muracella, where large cisterns and reservoirs were constructed in Roman times. The water-supply of the town of Capri is brought by tank-steamers from the Acqua di Serino, Naples.

The population of the island has increased from 6,843 persons in 1921 to nearly 8,000 in 1938. Most of these people live in the towns of Capri (Plate 77) and Anacapri, with 3,353 and 2,613 inhabitants respectively. The former lies about $\frac{1}{4}$ -mile inland at 450 feet on a saddle between the hills of S. Michele and Castiglione; the latter stands at 940 feet on the high, flat upland in the west of the island. The only other town is Marina Grande (1,281 inhabitants; Plate 78), the main port and sea-side resort. No more than 800 people dwell in isolated buildings outside these centres, and the so-called village of Marina Piccola is merely a chapel, bathing establishment and half a dozen houses. The remains of the magnificent Villa or Palazzo di Tiberio on the easternmost summit of Capri are much visited; near by is the cliff-top, 974 feet high, from which, according to tradition, Tiberius precipitated his victims. The tourist industry occupies many of the islanders; others obtain a livelihood by growing fruit, and especially olives for oil, and grapes for the local red and white wines. In addition the women do weaving and many of the coastal dwellers are actively engaged in fishing. Anacapri, Marina Grande, and Marina Piccola are joined to the town of Capri by excellent roads, which although often steep and circuitous are well engineered and carefully graded (Plate 76). In outlying districts most of the roads and paths are fairly steep but are kept in good repair. Omnibus services run on the main roads. The funicular railway from Marina Grande to Capri terminates at the Piazza Umberto Primo, which is by far the busiest place on the island. There is a telegraph service between the main villages and telephone connexion between Capri.

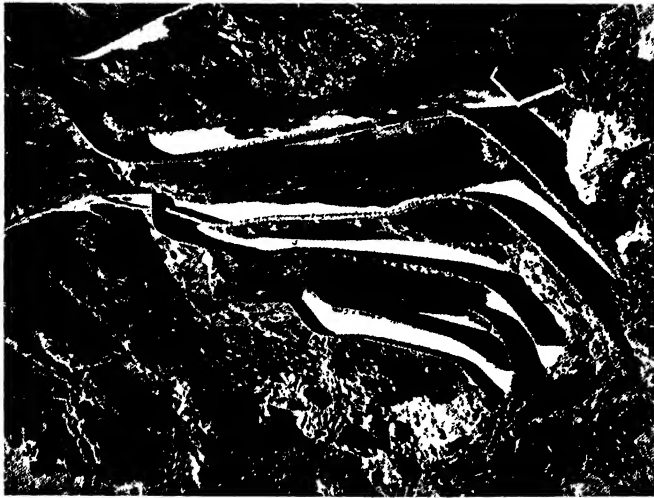


PLATE 76. Road inland from Marina
Piccola, Capri

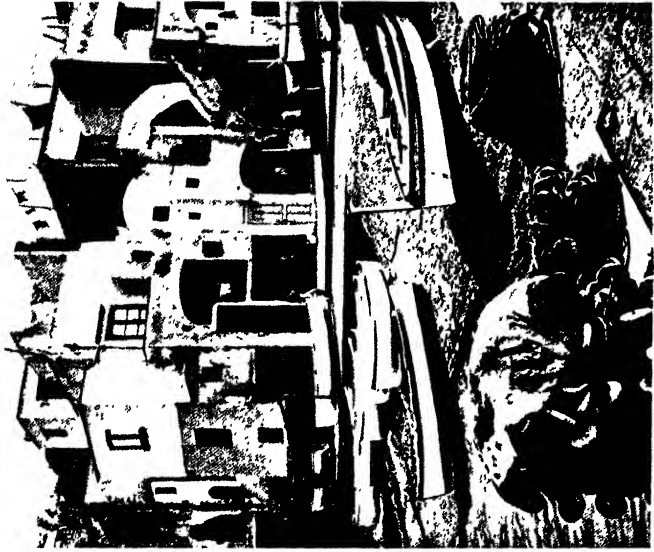


PLATE 77. The town of Capri

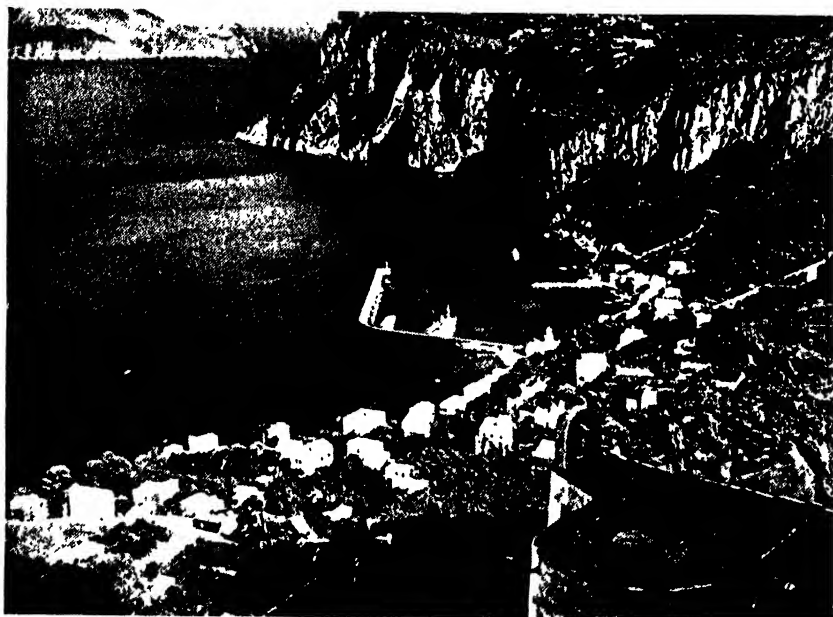


PLATE 78. *Marina Grande, Capri*



PLATE 79. *Scalo Pertuso at Ginostra, Stromboli*

and Anacapri and the mainland. Steamships call daily from Naples, Sorrento, and Amalfi, and numerous motor-boats make trips to the mainland when the sea is not too rough.

THE LIPARI ISLANDS

THE Isole Lipari, or Isole Eolie, lie in the angle between Sicily and the toe of Italy. Their southernmost point is only $12\frac{1}{2}$ miles from Cape Calava in north-eastern Sicily, and their easternmost point 34 miles from Cape Vaticano in Calabria. The archipelago consists of seven main islands and several islets, which together cover an area of $45\frac{1}{2}$ sq. miles and support about 16,000 people. The group centres upon Salina, from which Alicuri is 23 miles to the west, Stromboli 22 miles to the north-east, and Vulcano 9 miles to the south-east. Lipari is by far the most important of the islands, although Stromboli is better known because of its continual volcanic activity. The areas and populations of the main islands are given in the following table:

	<i>Area</i> (sq. miles)	<i>Estimated</i> <i>population (1938)</i>	<i>Summit height</i> (feet)
Stromboli . . .	5	1,800	3,040
Panarea . . .	$1\frac{1}{2}$	580	1,381
Salina . . .	$10\frac{1}{2}$	3,540	3,155
Lipari . . .	$14\frac{1}{2}$	8,900	1,975
Vulcano . . .	8	400	1,637
Filicuri . . .	$3\frac{1}{2}$	1,100	2,542
Alicuri . . .	2	600	2,185

The archipelago forms the see of a bishop (established in 1400), while its civil affairs fall within the administration of the province of Messina. Formerly used as a penal colony, certain of the islands again serve as places of exile for political prisoners. The population of the group has decreased considerably during the last fifty years, having dropped from 22,840 people in 1881 to 19,558 in 1911 and to about 17,700 in 1938. The decrease is due to emigration, which is especially prevalent in seasons when the vines are damaged by phylloxera.

Physically, the islands consist almost entirely of volcanic rocks and are disposed along three structural lines. The first line stretches from Stromboli to Panarea and Salina (28 miles), whence it is prolonged south-westwards in the great fault which crosses Sicily from Termini to Sciacca; the second line traverses the islands of Lipari

and Vulcano (11 miles), and reappears to the south in Cape Calava (sulphurous water), M. Etna, and the M. Iblei (basalts), and to the north in Vesuvius; the third structural line stretches from Filicuri to Alicuri and Ustica (78 miles), following a course practically

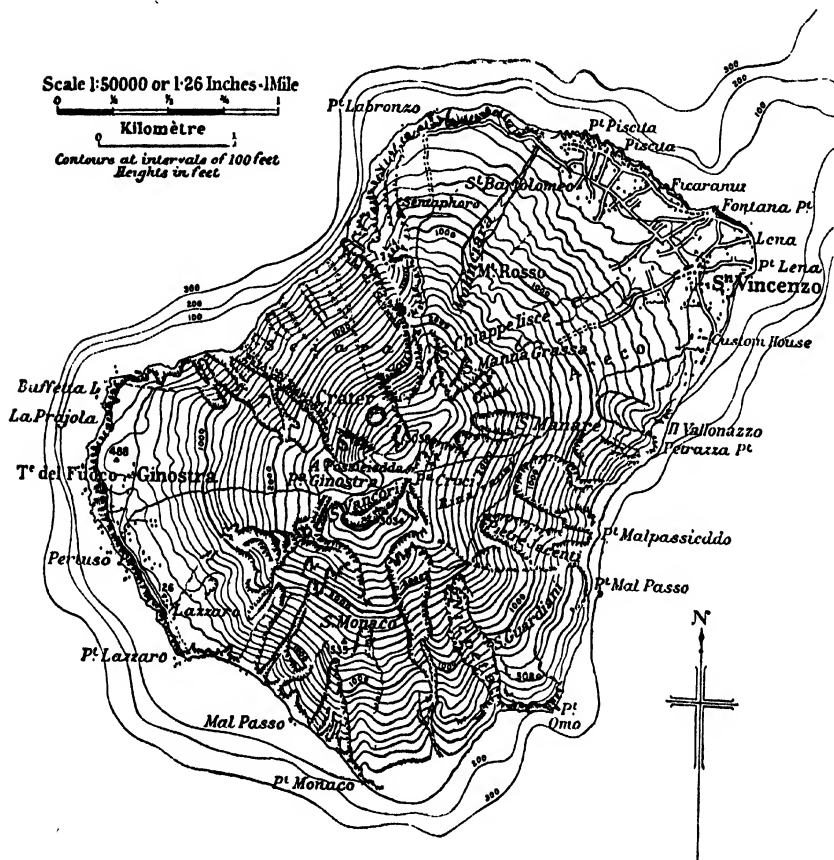


FIG. 64. *Stromboli*

parallel with the north coast of Sicily. The degree of volcanic activity varies considerably along these lines and is noticeably absent in the west. Thus on Alicuri and Filicuri vulcanism appears to have ceased long ago, whereas to the east there are hot springs on Salina and Lipari, recent lava-flows on Vulcano, and almost daily eruptions on Stromboli. The whole group suffers occasionally from earthquakes, the most serious in recent years being those of 1926.

The islands are for the most part high, steep-sided, and rocky.

The highest peaks, in Salina and Stromboli, rise to 3,155 feet and 3,040 feet respectively. Each island of the group contains one or more craters in varying stages of destruction by erosion. The outer slopes of these volcanic cones are incised by short, steep-sided gullies, and are usually rock-ridden. Patches of flat land are few, the chief having been formed by the emergence of tuff terraces laid down below sea-level in Tertiary times. The results of wave erosion are especially great on the north and west coasts of the islands, where craggy precipices, undermined cliffs, sea caves, and natural arches abound.

The soils of the islands are usually patchy, thin, and sandy; bare rock predominates and agriculture is mainly restricted to the few flatter areas, to rock-girt pockets on mountain slopes, and to carefully terraced hill-sides. The climate is less adverse to man, for in spite of strong winds, the winters are very mild and frosts are virtually unknown. In summer the sea-winds temper the heat and the noonday temperatures are slightly lower than those of Sicily. The rainfall is small and comes almost entirely in the winter half-year; snow is rare and seldom stays long on the ground. Because of the scanty precipitation and the smallness of the drainage areas, water is scarce throughout the islands. Since there are very few springs of potable water, the inhabitants obtain their drinking supply from rainwater that drains from flat roofs and artificial floors into carefully constructed cisterns.

The lack of soil and of surface-water, and the strength of the winds, greatly restrict tree growth, although on most of the islands a few trees and scattered bushes grow even amidst the boulders. The carob tree, patches of broom, and clumps of esparto grass occur here and there. The prickly pear, when cultivated, grows to an abnormal size. The vine and olive also flourish, but the most typical plant is the caper, which under favourable circumstances will form a compact, circular clump up to 1 yard high and 2 yards in diameter. The fauna is poor and in species resembles that of Sicily, the only common wild mammal being the rabbit. The spiders include the tarantula, whose bite may have serious consequences. The adjacent seas abound in life, among which are the dolphin, flying-fish (bonito), and turtle. The islanders do much fishing in small boats with rather primitive tackle, and from April to late June set long-nets within 5 miles of the east coasts of Lipari and Vulcano islands.

Economically the Lipari archipelago is of little importance. The main agricultural products normally yielding an exportable surplus

are wine, currants, and capers, and the only mineral product is pumice. Annual production is small and the exports, except pumice, go almost entirely to Sicily and the adjacent parts of southern Italy. Nor does their position afford the islands any great strategic value. The shipping routes from Messina to Naples pass close to Stromboli, and those from Messina to Genoa and Marseilles generally pass north or south of Panarea, but, quite apart from the complete lack of port facilities for large vessels, there is no reason for calling at the islands. The sea connexions of the archipelago depend upon local steamers that ply daily from Milazzo and weekly from Messina to Naples; the islands of Vulcano, Alicuri, and Filicuri are served mainly by local services from Lipari. The group is not a centre for submarine cables, although the islands are connected to each other and to Sicily by a submarine telegraph cable. On the islands themselves communications are by mule tracks with a few short stretches of poor roads near the larger villages.

STROMBOLI

Stromboli, the 'lighthouse of the Mediterranean', is situated nearly 22 miles north-north-east of Lipari. Although anciently named *Strongyle* (circular), the island is an oblong, $2\frac{1}{2}$ miles long by $1\frac{3}{4}$ miles wide, with an area of about 5 sq. miles (Fig. 64; Plates 79-82).

The surface consists mainly of basic lavas, which in the north-east and in patches elsewhere are covered with more recent tuffs and ashes. The volcano is almost continuously active, but the rim of the crater can be approached without danger when the vapour is not too dense. At fairly brief intervals huge bubbles of lava are ejected which explode noisily and are accompanied by showers of ashes that usually either fall back into the crater or roll harmlessly down the steep north-western slopes (the *sciara*) into the sea. The surface of the *sciara* slopes at an angle of 35° and is bounded on the north and south by high cliffs which canalize the rolling incandescent matter. Serious outbreaks, ejecting ashes and lava for long distances, are comparatively rare, but, as happened in 1889, 1891, 1907, 1912, 1915, 1919, and 1921, do much damage to the cultivated parts of the island by setting fire to the vineyards. Showers of fine dust and explosions that shake the whole island are less uncommon.

Stromboli is formed of a single, symmetrical volcanic cone, the summit of which (3,040 ft.) is the highest fragment of the lip of an ancient crater, and is more or less the central point of the island.

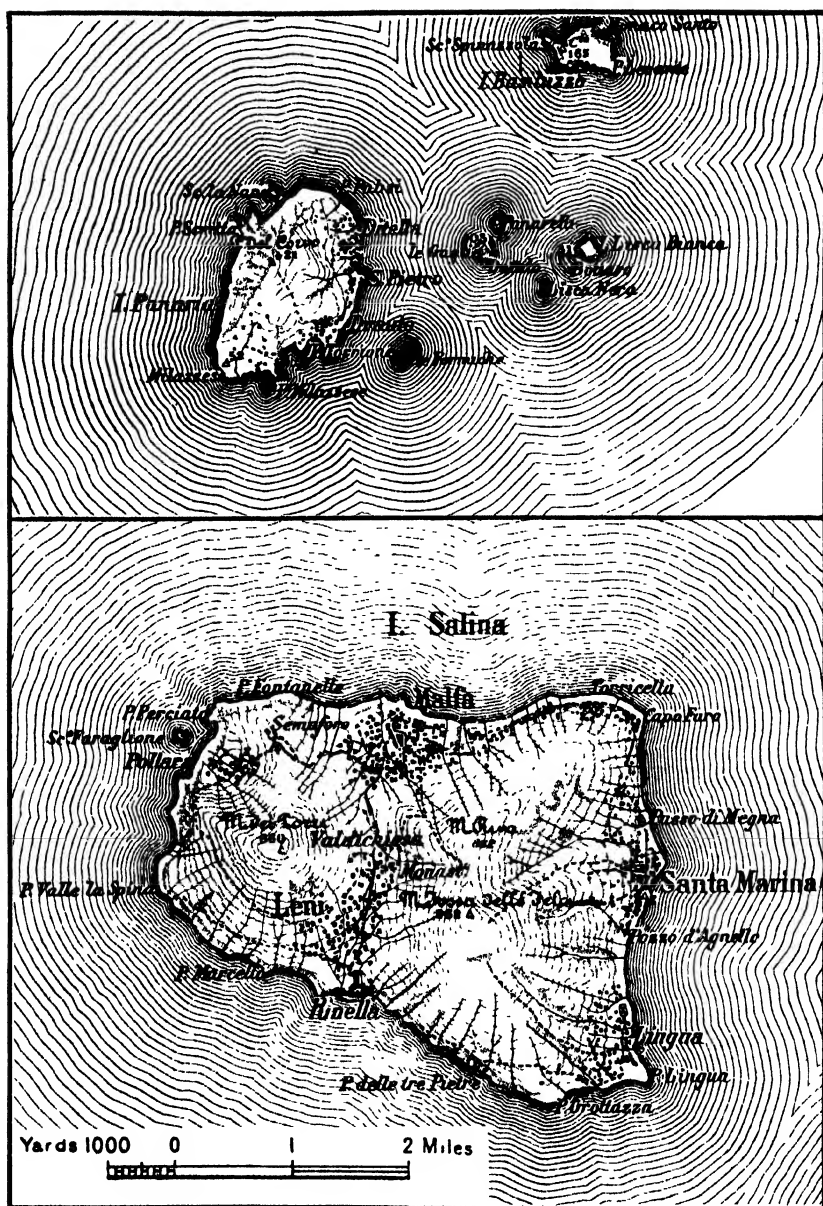


FIG. 65. Panarea and Salina

The present crater lies north-west of the old crater-rim. The slopes of the cone are precipitous on all sides except the north-east, where a low platform borders the coast, and the south-west, where a flatter area occurs above the cliff-tops at Ginostra. The coasts are for the most part rocky, rugged, and cliffed. Landings can be made at the Scalo Pertuso, a masonry landing-place surrounded by rocks at the foot of a stairway which zigzags up the cliffs to Ginostra (Plate 79). Here, however, no good anchorage can be obtained off shore. On the north coast small vessels can be beached west of Piscita and in the small cove of Insenatura di Ficagrande, north-west of S. Bartolomeo. Small boats can also be pulled up on a sandy beach near S. Vincenzo.

Between 1911 and 1938 the population of Stromboli decreased from 2,162 to about 1,800. Of these people, 300 dwell in the village of Ginostra in the south-west of the island, and almost all the others in the villages of S. Bartolomeo and S. Vincenzo, which together occupy the coastal lowlands of the north and north-east. S. Vincenzo, the chief village, has a resident doctor and two small lodging-houses.

Owing to the incoherent nature of much of the tuffs and lavas, the lower north-eastern and south-western slopes of Stromboli are cultivable. The main crops up to 1,300 feet are vines, olives, figs, and capers; on the rougher areas clumps of broom, reed, grass, fig, agave, and cactus grow amid the boulders. Near the coast the small fields are surrounded by lava-walls or by hedges of reed and cactus. The chief agricultural exports are wines, currants, and capers. There is a regular steamer service from Messina, Milazzo, and Naples, in addition to a twice-weekly service from Lipari which calls at both S. Vincenzo and Ginostra. Although Stromboli is so well known to travellers, few alight here, and the islanders have not developed a tourist industry.

PANAREA AND OFF-LYING ISLETS

Panarea (Panaria) lies about 8 miles north-east of Lipari and 11 miles south-west of Stromboli. About $1\frac{3}{4}$ miles long by $\frac{3}{4}$ mile wide and with an area of $1\frac{1}{4}$ sq. miles, it is the western exposure of a bank that reappears farther east as several islets and shoals (Fig. 65). Its surface consists mainly of tuffs and volcanic lavas which easily weather into soil. Relicts of dying volcanic activity are seen in the hot springs, notably off the beach of S. Pietro, and in the gaseous

exhalations (fumaroles) near Calcara. The island's water-supply comes from cisterns, although there is one well of potable water.

Panarea is divided lengthwise by a rocky mountain backbone which culminates in the Timpone del Corvo (1,381 ft.). This ridge drops precipitously to the rugged cliffs of the west coast and on the east falls more gradually in terraces and buttresses (Picco del Tribunale, 735 ft.). The western and northern coasts are high and deserted; the other coasts, although cliffed in part, have several narrow beaches where boats can be landed. On the north side of Point Peppemaria there is a pebbly beach with a small masonry landing-place, while large vessels can anchor 500 yards to the north-east of the headland. West of Point Torrione at Porto Drauto there is a beach of fine, reddish sand; in the extreme south at Milazzese bay is another sandy beach, but Cala Iunco, a small cove, is dangerous because of rocks. Small boats can obtain anchorage off this bay as well as south-east and north of Point Peppemaria.

The population of Panarea decreased from 654 in 1921 to 579 in 1938. Its inhabitants dwell on the lower slopes of the east side of the island, the majority living near the church of S. Pietro. There is no village, since the cottages are scattered among the boulders and the small patches of walled fields. Considering the smallness, height, and boulder-strewn nature of the island, its acreage of cultivation is large, most of the eastern slopes being under vines, other fruits, cereals, and grass. The vine, often on small, walled terraces, is grown on the flanks of the Timpone del Corvo up to well over 1,000 feet. In addition there are small olive-groves and clumps of cactus, myrtle, cistus, mastic, broom, and tall grasses on many of the stonier slopes.

A large submarine bank stretches east and north-east of Panarea. On the eastern parts of this bank the islets include Le Formiche, a few small exposed rocks, $\frac{1}{2}$ -mile south-east of Point Peppemaria, and a group of five larger rocks between 1 and 2 miles east of this headland. The latter group consists of Lisca Nera, a low, black rock about 110 yards long; Bottaro, a low rock 220 yards by 110 yards; Lisca Bianca, a whitish rock 333 yards long, 160 yards wide, and 95 feet high at its summit; Dattilo, a bold pyramid, 240 yards by 150 yards and 333 feet high; and Panarelli, a cluster of five small rocks of hard vitreous lava. Of these, only Lisca Bianca and Dattilo afford pasture, a few goats and ewes being brought hither seasonally by boat. The north-eastern part of the bank rises above sea-level at Basiluzzo, which covers an area of about 80 acres and measures 900 yards by

450 yards. This islet is steep sided and rises at its western end to 541 feet, whence it slopes gradually eastwards. Much of the surface, although flattish, is boulder-strewn and the crops of cereals and legumes are restricted to small fields. The rougher areas bear scattered clumps of rosemary, heliotrope, thistle, caper, artemisia, mastic, and euphorbia which afford browsing for stock. Although there are numerous traces of ancient dwellings and cisterns on Basiluzzo, to-day its few small hovels are inhabited only in the season of cultivation. Access to the summit is gained by means of a stepped path that winds inland from a small bay at the south-eastern extremity of the islet.

SALINA

Salina is situated $2\frac{1}{4}$ miles north-west of Lipari, which alone of this group exceeds it in size, population, and productivity. The island is oblong in shape, with a length of $4\frac{1}{2}$ miles, a breadth of between $2\frac{1}{4}$ miles and $3\frac{1}{2}$ miles, and an area of $10\frac{1}{4}$ sq. miles (Fig. 65).

Salina is more fortunate than its smaller western neighbours in so far as its outcrops of tuffs and scoriae are more extensive than those of basalt. All the lower areas of the north and centre, as well as the eastern slopes almost to the summit of M. Fossa della Felci, consist of various types of tuff and reddish cinders. Volcanic activity has practically ceased, the only signs of it being the warming of the ground by vapours east of Malfa and the intermittent discharge of hot gases in the sea off Rinella.

Salina is formed mainly by two large volcanic cones, connected by a low, flat saddle, which appears to bisect the island. The cone in the west, M. dei Porri, rises to 2,821 feet; its slopes are fairly regular except for a semicircular hollow, the relic of an old crater, near Pollara. M. Fossa della Felci, 3,155 feet, in the east is somewhat less regular in shape and retains a distinct but shallow crater which is liberally sprinkled with a growth of ferns, broom, and heather. The depression between these two cones rises to 935 feet near its centre, whence it drops gradually to a low coastal terrace at its northern and southern ends. There are several other flat or gently sloping tracts in Salina, the chief being near S. Marina and Lingua in the east and Pollara in the north-west. Most of these lowlands are crossed by small, deep gullies commencing in the flanks of the adjacent cones.

The western coast of Salina is high, cliffed, and almost inaccessible except south of Point Perciato. This headland has a large

natural arch, which is visible for a considerable distance; about 800 yards south-west of it a tall rock, the Faraglione di Pollara, marks the summit of a long rocky reef. The other coasts of the island rise for the most part from deep, shoal-free water. Malfa, the main village on the north coast, has a small stone landing-jetty; there are other landing-places for small boats near the lighthouse on Cape Faro (Lo Capo) and at Sta. Marina, the latter consisting of a small mole protected by a breakwater. Point Lingua, the south-eastern extremity of Salina, is low and is fronted by a shifting beach of coarse gravel and pebbles with a shoal off shore. The salt-pan here gave the island its present name.

Most of the inhabitants of Salina (3,540 in 1938) live in the five villages of Sta. Marina, Lingua, Leni-Rinella (Arenella), Malfa, and Pollara. Sta. Marina, the largest village and chief landing-place, stands on a flattish expanse of tuffs near the middle of the east coast. It possesses two churches, one of which has a large cupola. Lingua, a scattered village of a few hundred people, is situated mainly upon a gently sloping tuff terrace in the south-east of the island. Malfa, a large but dispersed settlement with a hospital and landing-jetty, occupies the flatter, northern parts of the central depression. From it widely scattered cottages dot the cliff-top slopes as far east as Cape Faro. The southern half of the central depression is occupied by Leni and Rinella. The latter consists of a compact cluster of dwellings near the sea, with a church on the slopes above and scattered houses straggling inland amid terraces and occasional trees. Leni is dispersed upon the southern, inland slopes of the depression. Its buildings include a church, with a tall belfry, similar in appearance to that of Rinella. Pollara, the other village of Salina, lies near the seaward edge of a large semicircular hollow in the north-west of the island.

The gentler slopes of Salina are for the most part fertile and cultivated. The areas under vine, olive, caper, and other fruits, together with the natural tree- and bush-growth, give the island a well-cultivated appearance. The main crops are vines, from which Malmsey (Malvasia) wine is made, grapes for currants (*passoline*), capers, olives, figs, and certain plants used for dyes. These, with fish and salt, form the chief exports of the island. Much of the agricultural land, particularly on the hill-sides above Pollara and Rinella, is carefully terraced. The people living near the coast, men and women alike, combine farming with fishing and sailing, consequently a great many small rowing boats and sailing vessels work

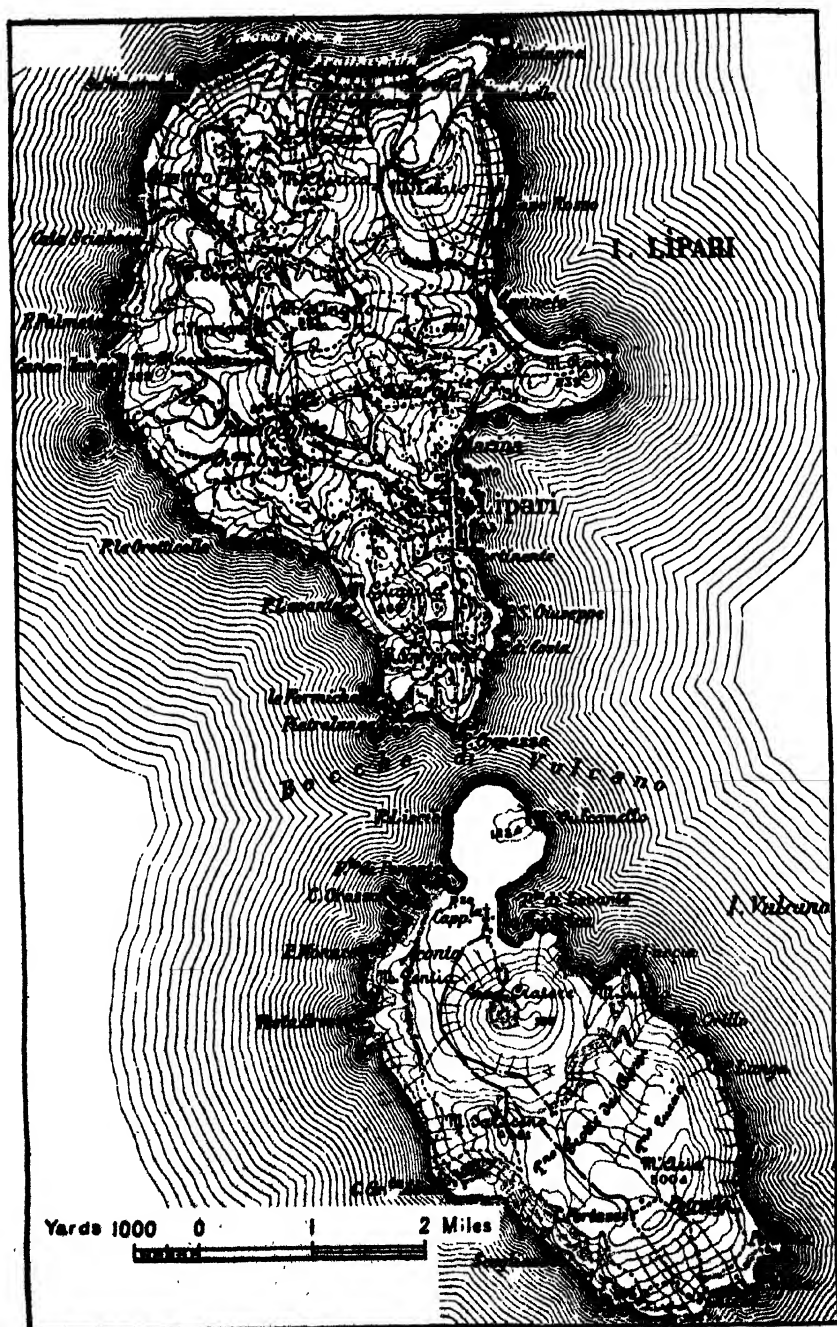


FIG. 66. *Lipari and Vulcano*

from the island. The principal fishing-ground is the Secca del Capo, a detached shoal ($4\frac{1}{2}$ fathoms) 3 miles north-east of Cape Faro, which is covered with marine plants and abounds in fish.

The inland communications of Salina are primitive. The main mule-track connects the north and south coasts at Malfa and Rinella respectively. Elsewhere, except for short stretches of bad road near Sta. Marina, the villages are linked by poor tracks, those to Pollara being especially difficult and tortuous.

LIPARI

Isola di Lipari, the largest and most important island of the archipelago, covers nearly $14\frac{1}{2}$ sq. miles (Fig. 66). It stretches for 6 miles from north to south and has an average width of 3 miles. Hot springs are the only form of volcanic activity at present.

Basalts floor the western coastal slopes and part of the flanks of the central mountain (M. San Angelo) and of the M. Rosa headland; trachytes and tuffs of a sandy and cemented nature floor the remainder of the island, except the north-east where pumice and obsidian predominate. The tuffs absorb much of the rainfall and yield in the higher areas a few potable springs and streams. However, the sources of drinking-water are so few that most of the inhabitants obtain their supplies from rain-water collected in cisterns.

The relief of Lipari consists mainly of five volcanic hills which are connected by low, shallow valleys or saddles. The chief summits, from north to south, are M. Chirica (1,975 ft.), M. San Angelo (1,948 ft.), and M. Guardia (Giardina; 1,211 ft.). In the north-east of the island is M. Pelato, a separate cone with a large depression on its north side from which a mass of black volcanic glass stretches to the sea. This great tongue, in parts over 1,000 yards wide and 2,000 yards long, is steep sided and has a convex summit gashed and pitted by rain-wash into hollows, seracs, and cornices much resembling those of a glacier. A similar but smaller mass descends the eastern flanks of M. San Angelo to the outskirts of Canneto. The seaward edges of M. San Angelo are interrupted by separate volcanic cones; in the west M. Mazzacarusu rises to 1,056 feet within a few hundred yards of the sea; in the east the twin dome-shaped cones of M. Rosa (785 ft.) form a bold, rocky headland. The southern part of Lipari is a hilly peninsula, broken by gorges into hill-masses rising to about 900 feet.

Although its coasts are mostly cliffed, Lipari has more stretches of beach than any other island of the archipelago. On the south-west access to the interior can be gained from the Val di Muria. On the north coast just east of Point Legno Nero there is a landing-place with a sea-wall at the village of Acquacalda, and near by is a partly constructed pier. On the east coast a narrow landing-beach occurs near Canneto in the bay north of the M. Rosa headland. The chief anchorages and landing-places of the island occur south of this promontory, the facilities including a mole that affords shelter to small craft and the wharves lining both sides of the small peninsula surmounted by the church of Anime del Purgatorio at the town of Lipari. The outer part of the southern wharf at this church has depths of 13 to 16 feet alongside.

The population of Lipari in 1938 was about 8,900. The eastern side of the island is fairly thickly populated whereas the western side, apart from two high platforms with two small villages and a few dozen isolated houses, is practically deserted. On the north coast the only village is Acquacalda, with about 600 inhabitants. The town of Lipari, the capital of the archipelago, stands on the south-eastern shores of the island. It has grown up on either side of a rocky headland that is crowned by a castle, the precincts of which also encircle the cathedral (restored in 1654) and three other churches. Thence streets stretch to the fishermen's quarter in the north and to the main warehouses near the church of Anime del Purgatorio in the south. The main built-up area includes a hospital, more than a dozen churches, and two small hotels. The present population of the town itself does not much exceed 4,500 people.

The gentler eastern slopes of Lipari and the high platforms on the western side are mainly under vines, olives, figs, and other fruits. Grapes for currants are widely grown on reed trellises, and, like the figs, yield fruit of excellent quality. The chief agricultural exports are Malmsey wine, currants, figs, capers, and small quantities of a few other fruits. The local fisheries are also productive and include the tunny. The main mineral product is pumice, which is excavated from quarries and mines in numerous places in the north-east and north. The mines or galleries are usually wide enough for the passage of a man with a basket. The stone is sold, graded, and stored mainly at Canneto. It is used in polishing, especially metal, glass, and celluloid surfaces, in the paper and cloth industries, and as abrasive soap. The output of the finished product has risen from 13,210 tons

in 1919 to about 57,600 tons in 1937, when 123,700 tons of rock were quarried. Between 65 and 70 per cent. of the total output is exported, much of it being in the form of pumice dust. In addition the people of Lipari also export filter-stones made of local tuff.

VULCANO

The oval-shaped island of Vulcano, which is separated from Lipari by a strait 875 yards wide, has a length of 5 miles, an average width of $2\frac{1}{2}$ miles, and an area of 8 sq. miles (Fig. 66; Plate 86). Its surface is mainly of cinders, tuffs, and scoria of recent formation, with some lava at M. Vulcanello and along the east coast. A great eruption occurred here in 1786; the last violent activity began in early August 1888 and continued till the spring of 1890; since then only fumaroles have been active. Because of the recent nature of the lavas the island is barren and rugged, especially in the west. Its southern half consists of an extinct volcano, the summits of which rise to 1,578 feet in M. Saraceno and to 1,637 feet in M. Aria. The northern half is formed of the Gran Cratere, from the upper slopes of which hot, white, sulphurous vapours issue. The main crater of this cone usually contains two or three small funnel-shaped vents and a few fumaroles. Its northern slopes drop to a low isthmus of lava and sand which joins the headland of Vulcanello to the main mass of the island. Vulcanello rose from the sea about 183 B.C., since when it has been eroded into a fairly regular, basalt cone, 400 feet high and 500 yards across the base. The two main anchorages for small boats are in the curving bays on either side of the Vulcanello isthmus; that on the west (Porto di Ponente) is the better, the eastern bay (Porto di Levante) being in parts rocky and shoal, and the water warm and sulphurous from hot, submarine upwellings.

The occurrence and constant threat of volcanic eruptions render Vulcano the least populated island of the archipelago. In 1938 only 401 people were living here. These obtained a livelihood from viticulture and fishing, their few cottages being on the isthmus of Vulcanello and in the extreme south of the island. In the past pumice, borax, alum, and other salts have been excavated, and in the mid-nineteenth century about 400 exiles and 50 other workmen were engaged in an alum and sulphur industry centred on the now ruined factory near the shore of Porto di Levante. Such activities ended with the great eruptions of 1888-1890, and the subsequent introduction of viticulture has failed to attract many settlers.

FILICURI

Isola Filicuri (Filicudi) lies about $8\frac{1}{2}$ miles east-north-east of Alicuri and 11 miles west of Salina, from which it is separated by sea over 500 fathoms deep. An oval-shaped island, with a greatest length of $3\frac{1}{4}$ miles and a greatest width of 2 miles, it covers an area of nearly $3\frac{3}{4}$ sq. miles (Fig. 67).

Four-fifths of the surface is floored with basalt; the remainder consists of reddish scoria, which forms the slopes on the north side between Fossa delle Felci and the sea as well as a few small patches elsewhere. Because of the absence of springs and wells, most cottages have their own cisterns, fed by rain-water from roof-tops.

The island rises fairly regularly but steeply to Fossa delle Felci (2,542 ft.), the crater of which has been practically obliterated by erosion. This cone is least steep in the east, where its symmetry is broken towards the south by a conical hill, Montagnola (1,092 ft.), and farther east by two buttress-like eminences of which Torrone (919 ft.) is the chief. The slopes of Fossa delle Felci are dissected by narrow gorges, which are the work of surface water. The oval shape of Filicuri is broken by the headland of Cape Graziono, which consists of a small volcanic cone (571 ft.) joined to the main islands by a flat isthmus about 550 yards long and not more than 66 feet above sea-level. All the steeper slopes of the island and those parts exposed to violent wave-action are craggy and boulder-strewn.

As a rule the coasts are rugged and cliffed, there being no good landing-place throughout the $8\frac{1}{2}$ miles of coastline. The north and north-west sides of the island are high and fringed with rocks and shoals. Point Perciato, west of the Fossa delle Felci, has a fine natural arch, close south-east of which is Grotta del Bue Marino, a cavern of exceptional size. About $1\frac{1}{4}$ miles north-west of this headland a group of rocks rises above the sea; they include the rick-shaped Montenassari (Nassaro) and La Canna, a rocky needle, much resembling an obelisk, 280 feet high. The eastern shores of Filicuri are less inhospitable. Anchorage can be obtained by small vessels on the north-eastern side of the isthmus of Cape Graziono, and also eastward of Point Stimpagnato, where there is a mooring-buoy. The main landing-place is on the south of the island at Punticella, where small boats can be pulled up on a narrow stony beach near a few cottages of coopers and fishermen.

The population of Filicuri decreased from 1,467 in 1911 to about 1,100 in 1938. The small white cottages are scattered in clusters of



PLATE 80. *Stromboli from Strombolicchio*

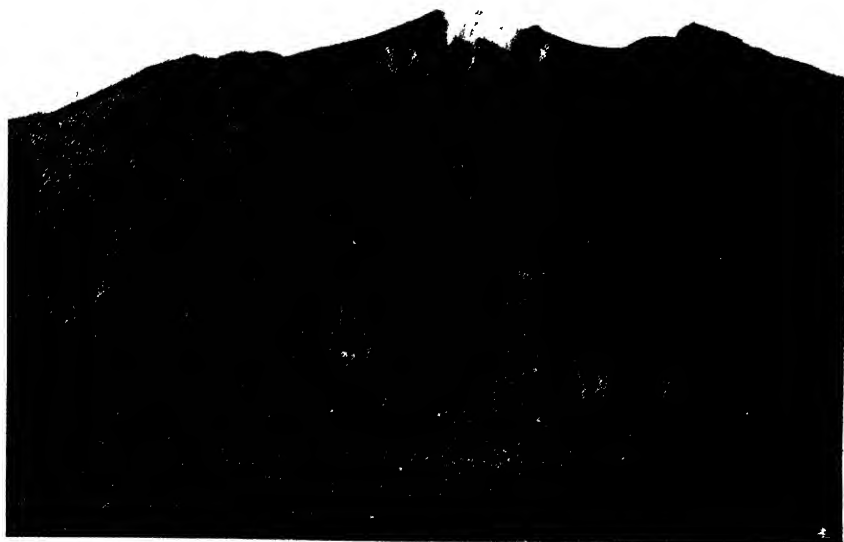


PLATE 81. *Sciara del Fuoco, Stromboli*

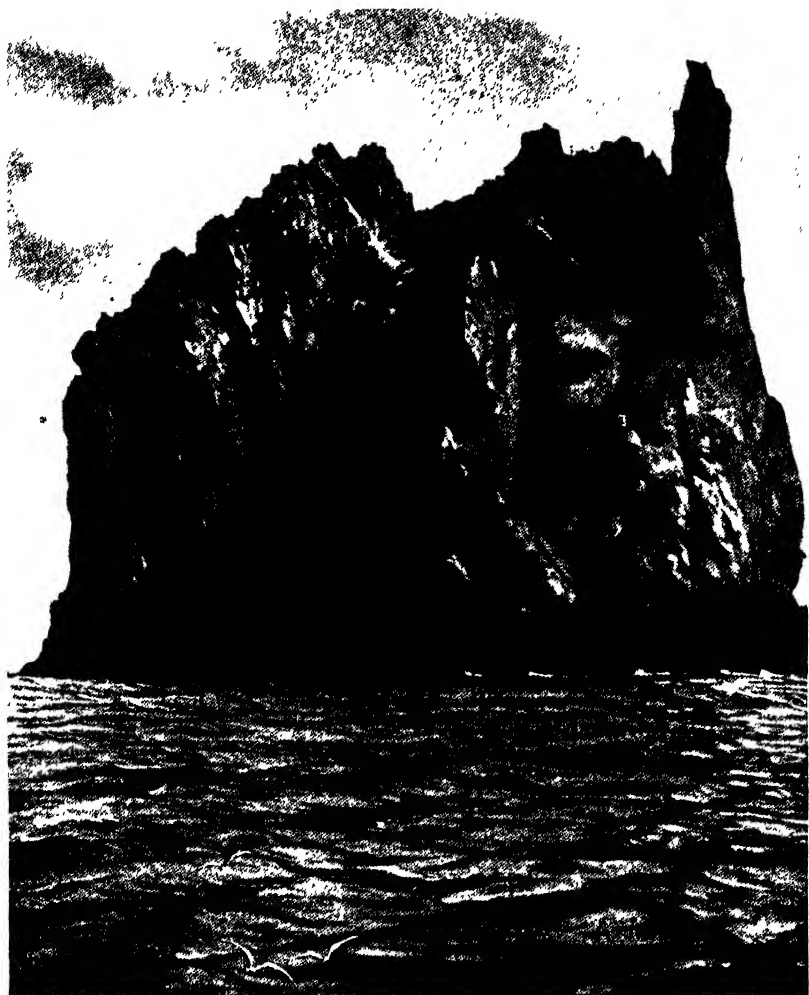


PLATE 82. *Strombolicchio, an islet north-east of Stromboli*

four to six dwellings mainly upon the south-eastern slopes of the island. The densest settlement is near Portello and Pecorini on the hill-slopes above Punticella. In addition there are clusters of dwellings on the flatter areas above the cliff-tops in the extreme north-east and west of the island, and a few widely scattered cottages on the isthmus of Cape Graziono. The houses are constructed of lava-blocks with a coating of plaster made of imported lime and of pumiceous detritus or volcanic sand dug locally. They are solidly built on a square plan with flat roofs, and have very small or no windows.

Filicuri is less bare than Alicuri, having some areas of coarse herbage and a scattered natural growth of cactus, cistus, dwarf palm, and other plants. The gentler slopes, especially on the slopes above Stimpagnato, are divided by low stone walls into small fields, and, where necessary, are carefully terraced. Vines, olives, figs, grain, capers, and a few smaller cultivations cover a considerable part of the island. The chief cultivable areas are Portello and Pecorini; only slightly less important are the cliff-top slopes near Point Zotta in the north-west and the low isthmus of Cape Graziono. The hill-sides above the cliffs of Point Zucco Grande in the north-east are also terraced with vineyards. The people keep a few cattle, which graze on the scanty herbage and are fed on woody fodder. The inhabitants of Pecorini and of the sea-side cottages of the Cape Graziono isthmus do much fishing from small boats. Fish and capers form the chief exports of the island.

From the landing-beach at Pecorini a good track leads northwards to the church of S. Stefano. Several rougher tracks branch from this main route to the other inhabited parts of Filicuri and to the vineyards high up on the eastern flanks of Fossa delle Felci.

ALICURI

Alicuri or Alicudi, the westernmost island of the Lipari group, lies about 23 miles west of Salina and 29 miles north-west of Cape Orlando in Sicily. The smallest and most isolated of the main Lipari islands, it has always been the least important economically, and was formerly named *Ericusa* as its intractable surface was covered mainly with heath. The island is circular in shape, with a diameter of about $1\frac{1}{2}$ miles and an area of about 2 sq. miles (Fig. 67).

Alicuri consists almost entirely of basalt and consequently lacks the tuffs which form the more cultivable parts of its neighbours.

Nor has it any sign of recent volcanic activity. It is for the most part a conical, basalt mountain, regular in form and rising steeply from the sea. The crater of Montagnole, the summit of the island, has been broken down by erosion into a shallow depression the rim of which reaches 2,185 feet in Punta del Femmine. The surface of the cone is rocky, especially on the steep western and northern sides; the eastern and southern slopes are less steep and in parts flatten out to steps which provide the only inhabitable areas of the island.

Except off its north-eastern and north-western coasts, where some rocks and shoals lie close in shore, Alicuri drops steeply to deep water. The western coast is precipitous and craggy, many of the cliffs being pierced with caves and overhanging the sea. Near the westernmost point is Scoglio Galera, a long, low, blackish rock, south of which temporary anchorage in 19 fathoms can be obtained at about 300 yards off shore. The eastern coast is lower and more accessible, although the so-called beaches are narrow stretches of stones. Small boats can be pulled up on stony beaches near Point Perciato and Point Palomba in the south-east of the island. An anchorage can be obtained in 14 to 16 fathoms at 100 yards off Bizzola.

About 600 people live on Alicuri, most of whom are fishermen and farmers, dwelling in small, white cottages dispersed upon the eastern slopes. The houses are least scattered on the flatter areas above the cliff-tops west of Point Perciato and Point Palomba, and near the church of S. Bartolomeo (Monmani) at 1,500 feet above sea-level. Agriculture is severely restricted by lack of soil and of water-supply, there being no springs nor wells. The main crops include figs, olives, capers, and carobs, which, together with a little grain, are grown on small terraced fields divided by low lava walls. The main cultivated areas are near the church of S. Bartolomeo and on the hill-slopes above Bizzola and Point Palomba. A few rough tracks link up these parts and connect with the coast at the landing-place near Point Palomba in the south-east of the island.

USTICA

THE solitary island of Ustica lies in the Tyrrhenian Sea, about 40 miles north-east of Cape S. Vito in western Sicily and 65 miles west of Alicuri in the Lipari archipelago. It is in the province of Palermo, on which it depends for its external connexions.

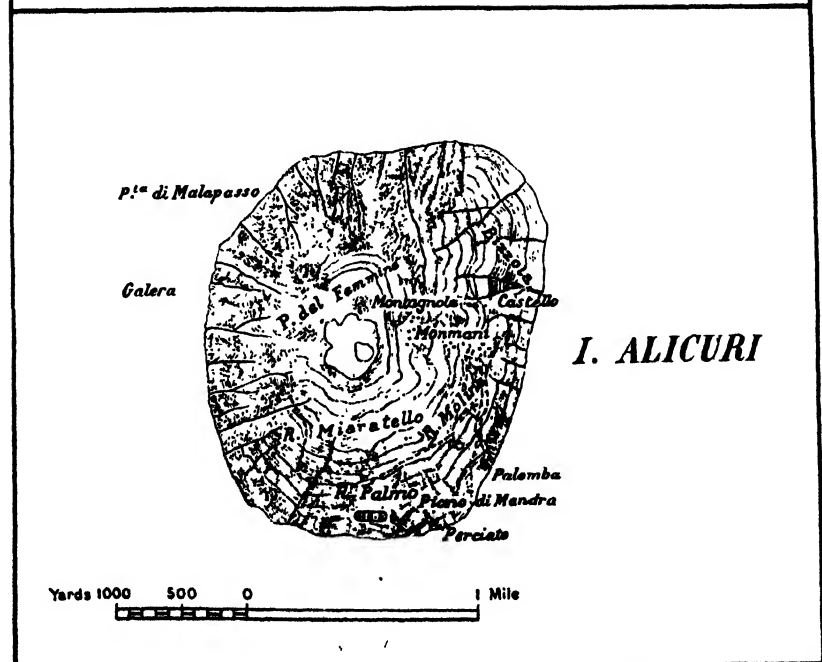
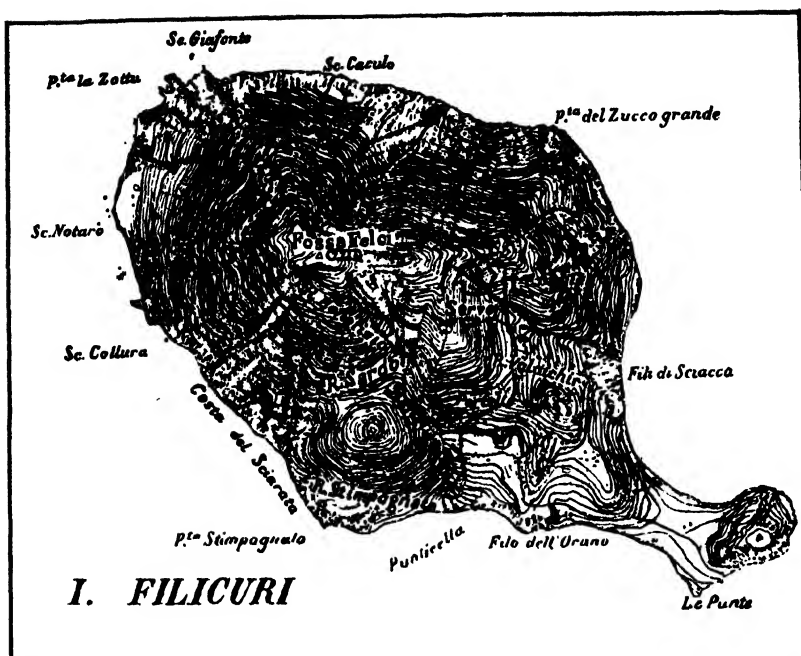


FIG. 67. *Filicuri and Alicuri*

The island is oval shaped and has a greatest length of $2\frac{3}{4}$ miles, maximum width of $1\frac{3}{4}$ miles, and an area of rather less than $3\frac{1}{2}$ sq. miles (Fig. 68). Most of its surface is basalt, but scoriaceous cliffs predominate in the north-east, upon the eastern coastal strip, and on the higher western parts of the main hill-range. All signs of vulcanism have long ceased and the former crater has been almost entirely obliterated by erosion. Earthquakes, occasionally of disturbing violence, are not uncommon. Because of the rapid run-off on the basalts and the smallness of the island, only two springs occur, and both are insignificant. Consequently nearly all houses possess cisterns. Some of these cisterns are communal, the largest, with a capacity of about 2 million gallons, being that constructed by the Government in a fold of the Falconiera hill. In addition, artificial ponds (*urne* or *gorghi*) are excavated and lined with potters' clay; these collect rain-water and the drainage from slopes and paved roads, thereby providing water, especially for cattle. In summer the shortage of drinking-water may necessitate supplies being brought by boat from Palermo.

Ustica is low and in no sense mountainous. It is crossed from east to west by a range of hills which consists of two hill-blocks with a gap between. The eastern block rises to over 800 feet near M. Guardia dei Turchi; the western attains about 765 feet near M. del Fallo. On the north the range drops steeply to the broad flat platform of Tramontana, whereas on the south it falls gradually to the undulating, hilly region of Oliastrello. Monte Falconiera (c. 500 ft.), the steep-sided hillock which forms the north-eastern extremity of Ustica, is a continuation of the central range. The coasts of the island are for the most part rocky and cliffed but not on a grand scale. The main landing-place is the Cala Sta. Maria on the south side of Monte Falconiera where small vessels can anchor in 24 feet about 100 yards off shore and large vessels can obtain anchorage at the entrance of the bay.

The inhabitants of Ustica are descended from settlers who came from the Lipari islands about the middle of the eighteenth century. Within a hundred years the population had increased to 3,600 and had so far outstripped the natural resources of the island that emigration began. By 1921 the population had decreased to about 140 people and has since remained practically stationary. The only village on the island is Ustica (Plate 84), which occupies a gently sloping tuff-platform 175 feet above the shore of the Cala Sta. Maria. To the north-east rises the steep flank of Monte Falconiera which

is crowned by the Fortezza (or castle), the home of a colony of exiles; to the north-west a gentler slope leads over a gap to the Cala del Camposanto, a small, cliffed bay on the north coast. The activities of the island centre on the village square of Ustica, around which more than half of the population of the island dwells. The village has a small hospital and a lodging-house as well as postal and telegraph services. The other dwellings on the island are dispersed upon the flatter, cultivated areas.

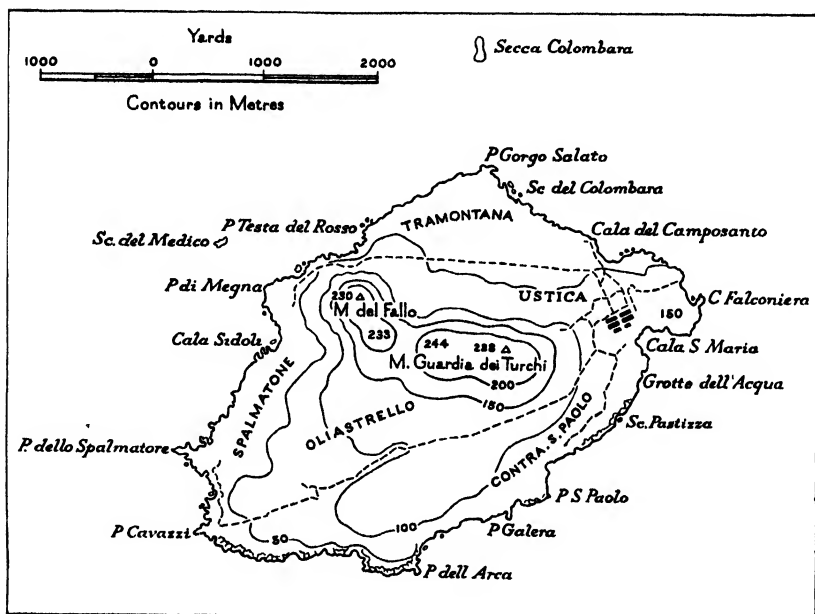


FIG. 68. *Ustica*

The main occupations are farming and fishing. The soils yield abundantly and all the flatter areas are intensively cultivated, the land being divided into small, walled fields. The main crops are legumes, grains, grapes, various other fruits, including figs and olives, and a wide variety of gourds. In addition, osiers are grown for basketry, and some stock and fowls are kept. In spite of this husbandry, the islanders are obliged to import agricultural products and especially grain. Considerable quantities of melons and of other gourds are exported to Palermo. Most of the people take some part in the fisheries, although the bulk of the catch is obtained by whole-time fishermen. The catch includes the bonito, various crus-

taceans and molluscs, the turtle, and fragments of coral and sponge. A minor occupation is the catching of game birds in spring and autumn when large numbers of quail, woodcock, curlew, and many other species frequent the island. The surplus products of the fishing and snaring are taken to Palermo and at times to Naples.

The flatter areas of Ustica are well served by cart- and mule-tracks. From the Cala Sta. Maria a road, with three sets of steps, leads to the centre of the village. As there is no port, ships cannot call at the island during very rough weather. The normal summer service to Palermo is, however, four times a week.

THE EGADI ISLANDS

THE Isole Egadi are but detached fragments of western Sicily, to which they are connected physically by a submarine bank of less than 100 fathoms. The group consists of three main islands and a few uninhabited rocks and islets, which together cover nearly 15 square miles and support just over 6,000 persons. Favignana, the largest and southernmost island, is 8 miles from Marsala; Levanzo, the northernmost island, is 9 miles west of Trapani; and Marettimo, the outermost island, is about 20 miles from the Sicilian mainland. The archipelago forms the commune of Favignana in the province of Trapani.

The islands are composed almost entirely of porous calcareous rocks which become increasingly crystalline in their higher layers. The relief is hilly or mountainous except on Favignana, where two extensive lowlands floored with shelly limestones (tufa) form the only areas really suitable for agriculture in the archipelago. Everywhere, however, the porous soils dry out quickly, and the Egadi lack the well-cultivated aspect of the more fertile parts of the volcanic Lipari islands.

Because of the indented nature of the coasts, bays with anchorages for small vessels abound, and there is a lively movement of fishing-craft. The Isole Egadi are important centres of the tunny fishery, and the harvest of the sea does much to compensate for the aridity of the soils. The main external connexions are by steamer three times a week from Trapani, to Levanzo, Marettimo, and Favignana, but Favignana is also a port of call on the weekly service from western Sicily to Pantelleria and Porto Empedocle. The tourist industry has been very little developed and visitors normally go only to Favignana island.

FAVIGNANA

In size, population, and production Favignana is by far the chief island of the Egadi group. Long and irregular in shape, it has a maximum length of $5\frac{1}{2}$ miles, a maximum width of $2\frac{1}{2}$ miles, and an area of $7\frac{3}{4}$ sq. miles (Fig. 69). A narrow limestone ridge, which attains 990 feet near Forte Sta. Caterina, crosses the island from north to south at its widest part. An extensive plain, between 30 and 100 feet high, stretches from this ridge to the eastern and western coasts. Consequently, except at the seaward ends of the ridge, the coast is low and access inland easy. Numerous bays provide anchorages for small boats, especially off the south-east and east coasts. A stone landing-place has been built at Point Marsala, the south-eastern extremity of the island. The chief port is the town of Favignana, which stands on the east side of a bay with depths of less than 18 feet. Here a masonry jetty, extending from the waterfront near the town for about 90 yards in a north-westerly direction, has 10 feet of water at its head. Anchorage for larger vessels can be obtained off the port except during strong northerly winds.

The total population of the island numbers 5,000 people, of which all but a few hundreds live in the town of Favignana. This settlement, which has grown up around a church on the chief bay of the north coast, has paved streets, a telephone service, and a small hotel. Elsewhere, even upon the extensive plains, cottages are few and are spaced at wide intervals along the roads or tracks. Because of their dryness these plains are mainly given over to stock-rearing with occasional patches of cereals and of vine. Many of the inhabitants obtain a living from fishing, Favignana being the chief centre of tunny fishing in Sicily. Tunny nets are laid out each year on both sides of the approach to the bay near the town, and in a good season 18,000 fish have been caught here and in a subsidiary fishery off the islet of Formica. A large canning-factory stands on the western shore of the bay opposite the village. The island is also visited seasonally by migrant game-birds, the catching of which provides a fleeting occupation.

The flatter parts of Favignana are served by poor roads and cart- and mule-tracks. A secondary road from the main village skirts the southern end of the hills and continues to the west coast. Other secondary roads, also probably not metalled, join Favignana village to the east coast near Point Marsala. The steamers calling at the island stop about 1,000 yards off the port, and landing is by means of small boats.



PLATE 83. *Vulcano island from Lipari*



PLATE 84. *The town of Ustica*

LEVANZO

Isola di Levanzo lies about $2\frac{1}{2}$ miles north-west of Point Faraglione, the northernmost point of Favignana. The small, pear-shaped island just exceeds 2 sq. miles in area, its maximum measurements being 3 miles by $1\frac{1}{4}$ miles (Fig. 69). It is traversed from north to south by a steep, rugged limestone ridge, which attains 912 feet in the Pizzo del Monaco. The island has no water-supply other than cisterns. Its coasts rise steeply in high cliffs except on the extreme north-west and south-east. The main landing-place is in the south at the small cove near Levanzo village, where nearly all the 330 inhabitants of the island live. The pastures support a few stock, while the gentler slopes above the cliff-tops of the south-east are planted with vines and cereals. The islanders also busy themselves with fishing.

About midway between Levanzo and the Sicilian coast are Isolotto Maraone, a low, deserted rock about 650 yards long, and Isolotto Formica, which is slightly higher and longer (area, 20 acres). The latter has buildings on it and is inhabited during the tunny-fishing season when nets are laid off its coast. It has a small boat-harbour at its southern end, whence the tunny are taken for canning to Favignana.

MARETTIMO

Isola Marettimo, the most isolated island of the Egadi group, is about 10 miles west of Favignana. It is a high, mountainous block of limestone measuring $4\frac{3}{4}$ miles by $1\frac{1}{2}$ miles and covering nearly $4\frac{3}{4}$ sq. miles (Fig. 69). Springs are rare, the only easily accessible one rising on the hill-slopes above the main village. The lofty central ridge falls precipitously to the sea, especially in the north and west where M. Falcone attains 2,250 feet. As the summit of the ridge seldom drops below 1,500 feet, there is practically no flat land on the island. In the south-east the mountains end in a small peninsula which does not exceed 600 feet. The coasts are for the most part steep and precipitous, and on the north and west access inland is practically impossible. Anchorage for small vessels can be obtained off most of the bays of the island, according to the direction of the wind, while larger vessels can find temporary anchorage in 33-40 ft. off the main village. A small masonry jetty has been built at each end of the village.

All but a few score of the 1,100 inhabitants of Marettimo live in

the village on Point S. Simone, a low headland projecting from the middle of the east coast. It has one small inn. Since the relief almost prohibits agriculture, the islanders' main occupation is fishing, the most notable products being salted sardines. The inland communications consist only of rough mule-tracks.

PANTELLERIA

PANTELLERIA occupies a central position in the channel between Sicily and Tunisia, and thus affords a strategic site for naval and air bases in the 'waist' of the Mediterranean Sea. It lies 55 miles south-west of Cape Granitola in Sicily and 46 miles east-south-east of Cape Bon in Tunisia. It falls within the civil administration of Trapani, Sicily. The island is elliptical in shape, its greatest length being about $8\frac{1}{2}$ miles (north-west to south-east), its greatest width about 5 miles, and its area about 32 sq. miles (Fig. 70; Plates 85-88).

Geology

Pantelleria is entirely volcanic and consists of lava-flows, volcanic ash, and volcanic cones, some of which are much worn down by erosion while others preserve their summit-craters and steep-sided conical shape. The oldest lavas, which outcrop mainly south-west of M. Gibeles and in the coastal areas, are dense and massive although interbedded with layers of consolidated ash. The lower slopes of Montagna Grande, the M. Gelkhamar area, and the recent lava-flows of Lave Khagiar and Lave Gelfiser are formed mainly of black, glassy lava. In contrast, the upper western and northern slopes of Montagna Grande and the lowlands east of M. Gibeles are blanketed by a soft pumice in the form of a pale yellow dust which is extremely porous and behaves underfoot like snow or sand. The north-western parts of the island are floored with dark flows of basalt, crowned here and there by small steep cones of clinkers. The only alluvial soils occur near the shores of a lake, the Bagno dell' Acqua. None of the volcanic cones on Pantelleria is active, the last eruptions being in May 1890 and October 1891. The latter occurred on the sea-floor about 3 miles north-west of Point S. Leonardo; it was accompanied by an earthquake which caused an elevation of about $2\frac{1}{2}$ feet on the northern coast of Pantelleria. There are many thermal springs and several fumaroles on the island.

Relief

The greater part of Pantelleria is occupied by the Montagna Grande hill-mass, which sinks in the north-west to a low basalt

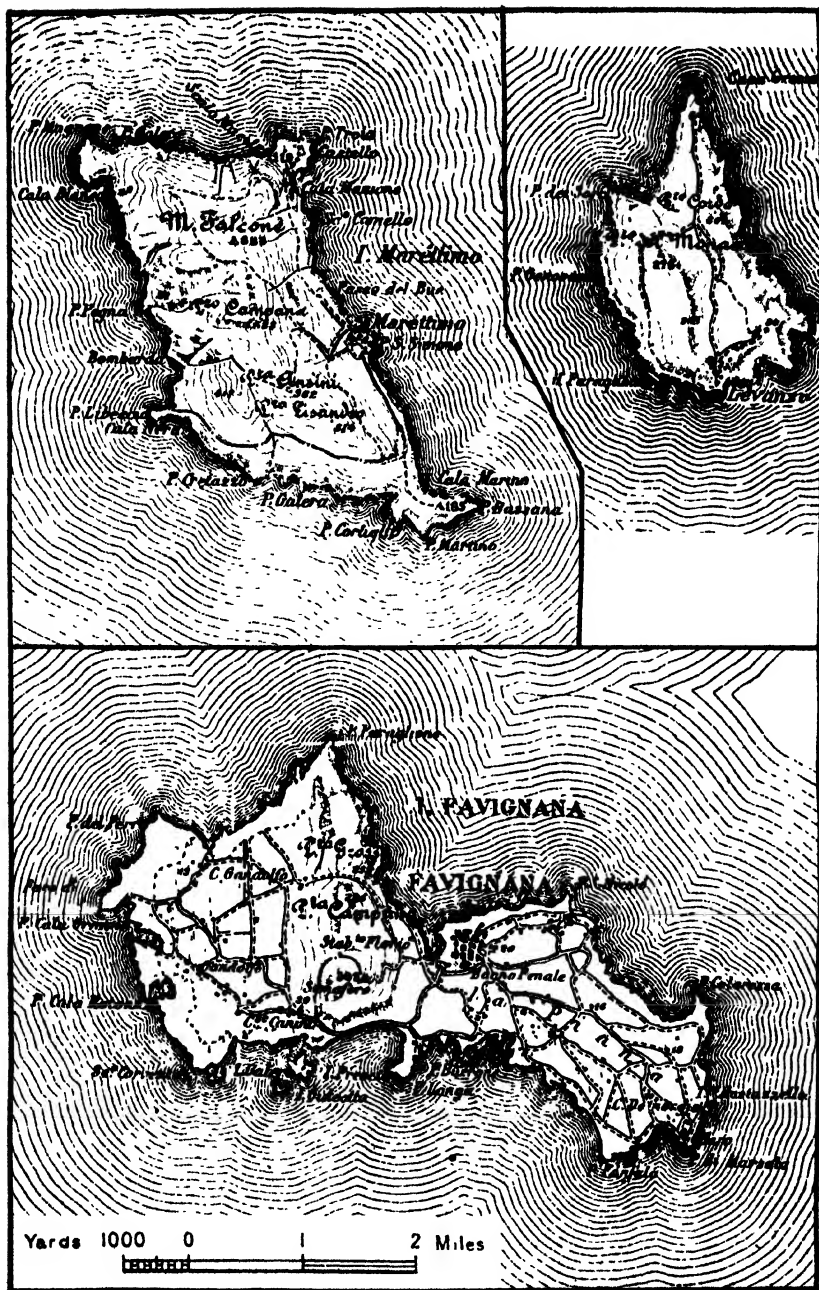


FIG. 69. Favignana, Levanzo, and Marettimo

plateau and the smaller cone of M. Gelkhamar. The relief of the Montagna Grande area consists of three components: the more recent central cone, the ancient crater-floor from which this cone has arisen, and the ancient crater-rim partially enclosing this old crater-floor. The central cone attains 2,743 feet in Montagna Grande. This volcano slopes relatively gently towards the north and north-west, where its flanks are interrupted by the cone of M. Gelfiser (1,293 ft.) and by several minor craters, including Cuddia Randazzo (1,365 ft.). Lava-flows have issued in fairly recent times from some of these smaller craters; from the steep northern edge of the crater of M. Gelfiser a very rough flow about 1,640 feet wide extends a mile northwards; from the Cuddia Randazzo a tongue of jumbled, sharp-edged blocks of lava, known as Lave Cuttinari in its upper reaches and Lave Khagiar near the coast, stretches $1\frac{3}{4}$ miles to the sea where it forms the coastline for $1\frac{1}{4}$ miles. In contrast with the gentle northern slopes, the south and south-eastern sides of Montagna Grande drop in precipitous cliffs. From the foot of the eastern scarp, and separated from it by a deep, narrow valley, rises the steep cone of M. Gible Grande (2,297 ft.).

The crater-floor, a moat-like lowland surrounding the foot of Montagna Grande, is discontinuous and very variable in altitude. It is filled in the north by the lava-flows of Gelfiser and Khagiar, between which is the lowland about the Bagno dell' Acqua. On the west the lake is overlooked by the abrupt inner edge of the old crater-rim; on the seaward side it is dominated by a steep, but lower, scarp. The crater-floor west of Montagna Grande is represented by the valley of Madonna Rosario and farther south by the long narrow basin of Monastero, the floor of which is broken by low transverse scarps into three flattish steps. In the south-east Montagna Grande drops to a belt of hilly country, but the encircling plain reappears in the east where the low, flat basin of La Chiesa, $1\frac{1}{2}$ miles long by $\frac{1}{2}$ mile wide, is entirely surrounded by higher land.

The remnants of the ancient crater-rim form a crescent-shaped belt of hills flanking the coast of eastern Pantelleria. In the east is the Sierra Ghirlanda (1,260 ft.), which on its landward side falls steeply to the plain of La Chiesa; farther south the rim widens into a plateau (1,322 ft.) which grades into the steep, circular cone of Cuddia Attalora (1,837 ft.). Throughout this area a fairly smooth slope extends from the summits of the hills to the top of the high coastal cliffs. In south-western and western Pantelleria the ancient crater-rim is narrow and low but often steep on its inner face. It

forms a sharp ridge near the plain of Monastero, whereas farther north it expands into the Cuddia Sciuvechi, a broken hilly region up to 1,276 feet high. The abrupt scarp of the Costa di Zinca overlooking the Bagno dell' Acqua is also a fragment of the old crater rim.

North-western Pantelleria is topographically distinct from the Montagna Grande region, since it is for the most part a low flat area with only one large cone (M. Gelkhamar, 948 ft.). Apart from this cone and several, small steep-sided cones, the surface slopes fairly regularly, the only scarps being low and short. The relief is especially flat north-east of M. Gelkhamar, where, at a height of between 600 feet and 700 feet, the main airfield of the island has been constructed.

Coast and Ports

The coasts of Pantelleria are generally rugged and high except for short stretches in the north and north-west. Between the port of Pantelleria and Point Spadillo small, rocky bays alternate with low, cliffed headlands. When the weather is bad off Porto di Pantelleria, the mail steamers usually anchor (in 16 fathoms) west of La Mantua, where small boats can make use of a rocky beach for landing. Between Point Spadillo and Punta Tracino the coast is irregular, rocky, and cliffed; the main landing-place here is the small natural quay in the Cala di Tramontana. Thence to Point Polacca precipitous cliffs, in parts nearly 1,000 feet high, form the coast and the only frequented landing-place is a small natural rock quay for boats at Porto Dietro Isola. Between Point Polacca and Point Tre Pietre the cliffs are still high (up to 400 ft.) and practically restrict landings to Porto di Scauri, where there are three small quays, one of which is about 50 feet long and has depths of 10 to 13 feet on its northern side. The coast from Point Tre Pietre northwards to Porto di Pantelleria is devoid of good landing-places and is exposed to north-westerly winds.

The main harbour of the island is Porto di Pantelleria, which lies at the head of the bay between Point Croce and Point S. Leonardo. The port consists of shallow inner harbour enclosed by a breakwater and a mole, and an outer harbour which is little more than a roadstead sheltered by a breakwater in the lee of which one or two small ships can berth. The port is exposed to winds between west and north-east, which often render access to the inner harbour impossible.

The outer harbour is bounded on the west by a breakwater which

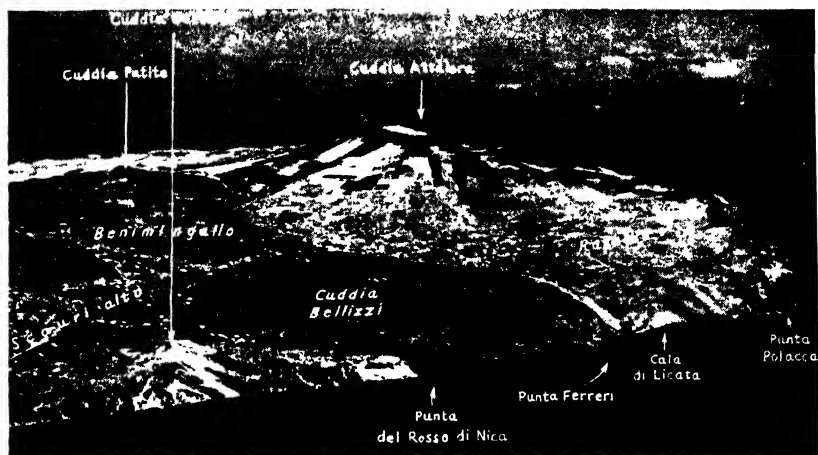


PLATE 85. *Southern Pantelleria*



PLATE 86. *South-western Pantelleria*

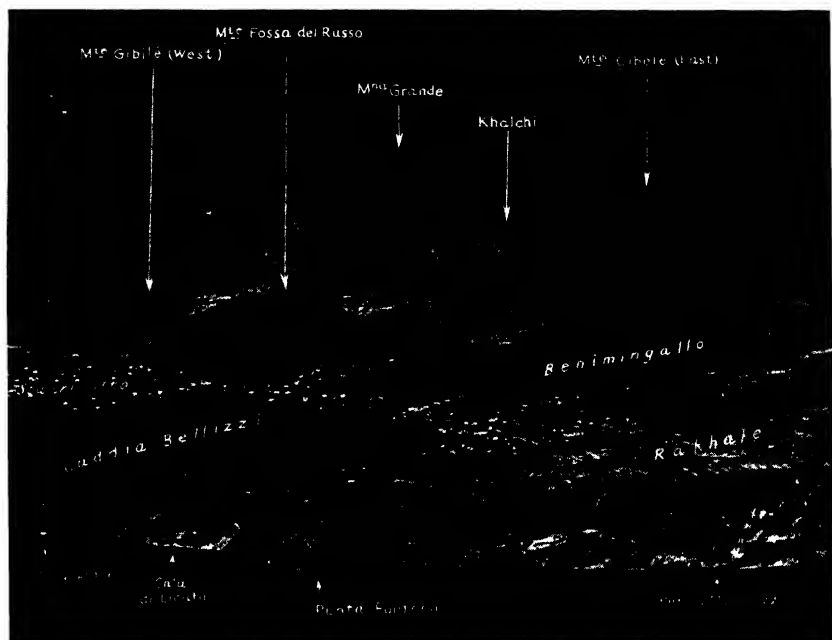
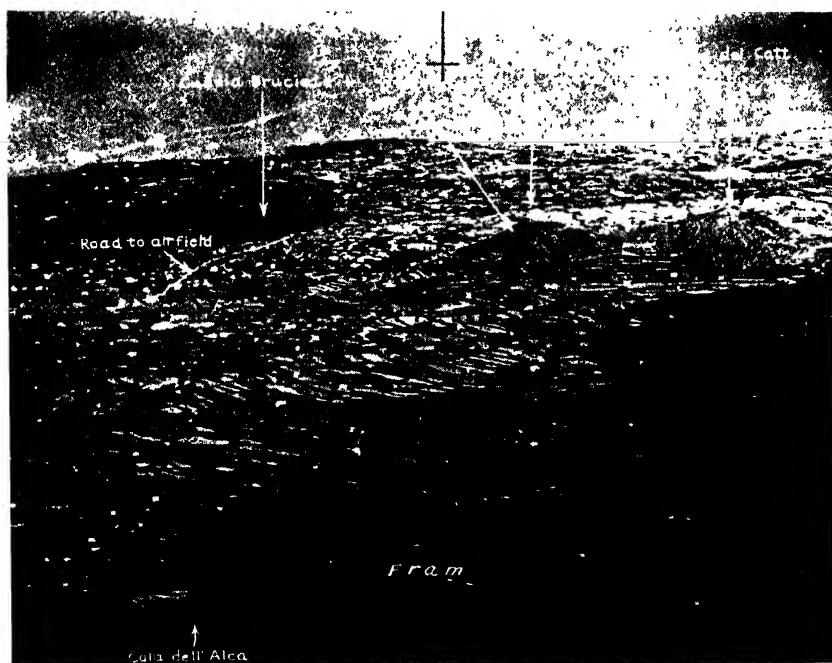


PLATE 87. *South-central Pantelleria*



extends from the shore for about 850 feet in a north-north-east direction before turning eastward for about 475 feet. It has no quays except for about 35 feet near the root of its inner side, but a T-headed berthing-stage, about 100 feet long with depths of 19 to 20 feet alongside, has been built at its northern end. There is a small slipway at the south-western corner of this harbour.

The inner harbour is shallow and can only provide limited accommodation for small vessels up to 200 feet in length and 10 feet in draught. It is protected on the north side by a mole 375 feet long, and on the west by a breakwater about 1,250 feet long. The former is quayed for 250 feet (depths of 5-6 ft.); the latter is also quayed for 250 feet with depths of 10 to 12 feet alongside. The entrance to the inner harbour lies between the eastern mole and the head of Molo Vecchio, a line of rocks, all that remains of an ancient mole. The entrance, which is about 180 feet wide, is not far north of the large flat shoal of Tre Colonne. Most of the shore of the inner harbour is quayed, the total length of quayage being about 1,660 feet; there are also two small jetties and two slipways.

The normal trade of Porto di Pantelleria is negligible. Imports consist mainly of general merchandise, especially manufactures, and the exports of agricultural produce, the chief items being grapes, wine, dried figs, capers, lentils, and livestock. In 1936 about 630 ships, totalling 165,000 tons, entered the harbour and the total annual traffic, in and out, was less than 20,000 tons. The large increase in goods traffic in subsequent years was entirely connected with military activities on the island.

Climate, Vegetation, and Water-Supply

The climate of Pantelleria is typically Mediterranean, the annual rainfall on the lower areas totalling about 15 inches, most of which falls between October and March. Persistent rain is rare, but the rain-storms are often heavy, and especially those associated with thunder in autumn and early winter. The usual directions of wind and sea are from west and north-west, with south-east as next in frequency during autumn and winter.

The vegetation consists mainly of sparse, stunted xerophytic scrub with an intermixture of low pines and oaks. Only the roughest, uncultivable areas are under natural tree-growth.

The islanders obtain the bulk of their water-supply from rain-water collected on flat roofs and stored underground in cisterns. These structures are liable to be cracked by earthquake shocks, as

happened late in 1891. Several wells have been driven in the basalt in the north-west, and there is a sea-water distillation plant in Porto di Pantelleria. These various supplies are sufficient except during prolonged droughts. The island has no permanent streams and its only lake, the Bagno dell' Acqua, is brackish. The surface of this lake, which measures approximately 1,640 feet by 1,970 feet, varies in size and height with the rainfall. It is usually highest in early spring and lowest in early autumn, but seldom rises sufficiently to cover completely the salt-encrusted plain surrounding it.

Population

The population of Pantelleria is normally about 9,000 people, of which 3,800 live in the port and the remainder dwell in cottages dispersed fairly evenly over the flatter areas. Only the higher slopes of Montagna Grande and M. Gelkhamar and the hilly crescent of the south-east are practically uninhabited; the recent lava-flows are also usually too rough for settlement. The most densely peopled rural areas are the low plateau of the north-west and the basins and coastal slopes of the east and south-west. The cottages are seldom grouped together, and the so-called 'village' of Khamma or S. Francesco contains only 740 of the 2,150 people in its vicinity (Fig. 70).

The only town is Porto di Pantelleria at the head of the main bay on the north-west coast. The older part of this settlement consists of several narrow, tortuous streets radiating from the Piazza Cavour, the main square; here most of the houses are small, whitewashed structures, although a few larger buildings have been constructed. The southern or newer part is more modern, with wider streets. The town has an electricity supply, a telegraph and telephone service, a hospital, several small inns, and a small wine-factory.

Industries

The islanders obtain a living from agriculture and fishing. Only the steepest, roughest, and driest parts of the island are not intensively cultivated. In most of the cultivable areas small terraces, held up by low walls, are constructed; in the flatter districts the fields are usually divided by thick, high walls which shelter crops from the wind. Vines occupy the greatest acreage, the grapes being used for wine or for export, either fresh or dried; figs, capers, and lentils are widely grown, and oats, barley, and vegetables on a smaller scale. In addition, cows, pigs, and goats are kept and donkeys are reared as beasts of burden. Fishing is commonly followed

near the coast and supplies a surplus for export in some years. The only manufactures are wines, barrels for wine, and cement.

Communications

Pantelleria is served by steamships plying weekly from Trapani to Porto Empedocle, and fortnightly from Palermo and Trapani to Tunis. A submarine telegraph cable from Marzara del Vallo in Sicily lands just north of Porto di Pantelleria. The internal communications of the island are mainly concerned with the needs of the modern airfield and its defence from invasion. A light railway runs from the port to a quarry at Cala dell' Alca on the north-west coast. The road system consists of two elements: firstly, the old network of cart-roads and tracks serving the main cultivated areas; secondly, the modern system of strategic roads. The former are little more than mule-tracks; the latter are usually well engineered and many of them are suitable for two-way wheeled traffic of any kind. The strategic network includes a good road round the island keeping as near the cliff-tops as possible, and several branches leading inland to the airfield and to observation points. The Khamma district and Porto di Scauri are linked by telegraph and telephone to Porto di Pantelleria.

THE PELAGIE ISLANDS

THE Pelagic archipelago (Isole Pelagie) consists of the island of Lampedusa, the islet of Linosa, and the rock of Lampione. The total area is about 10 sq. miles and the population 3,400 persons. The group, which comes under the civil administration of the province of Agrigento, is of no economic importance, but derives a certain strategic value from its position midway between Malta and the Tunisian coast. Only Lampedusa and Linosa are inhabited; both are connected by submarine telegraph cable to Pantelleria and have weekly steamship services from Trapani, Pantelleria, and Porto Empedocle.

LAMPEDUSA

Isola di Lampedusa, the largest and most southerly island of the group, is a barren block of whitish limestone extending for about 6 miles from north-west to south-east with an average width of

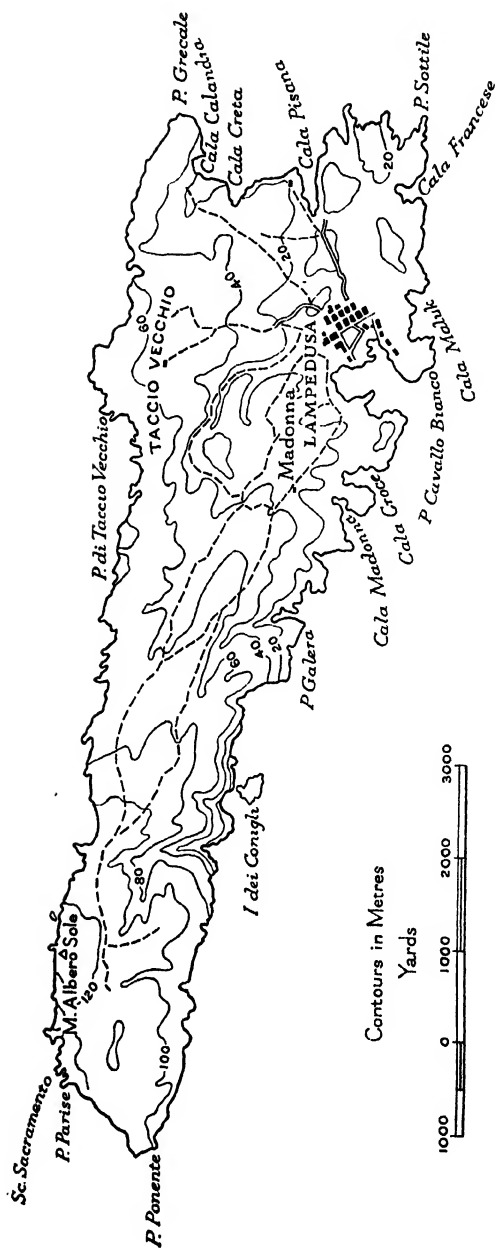


FIG. 71. Lampedusa

1½ miles (Fig. 71). Its surface, 8 sq. miles, is flat or gently undulating, the summit height being M. Albero Sole (436 ft.) at the western end of the north coast. From this hill the land slopes gently south-eastwards to sea-level. Since the island has no watercourses nor springs, the drinking-supply comes from storage cisterns. In 1936 an artificial lake, which will feed a reservoir near the village of Lampedusa, was under construction at Taccio Vecchio in the north of the island. The coasts are rocky and steep except in the south-east, where there are several bays, the largest of which forms the port of Lampedusa. The port consists of three small coves, of which the north-eastern, Cala Palma, provides the landing-place for the village. A small mole projects from the north side of the entrance to Cala Palma, and the shores of the cove, except for the sands at its head, are quayed. The other two coves of the main bay have one or two small jetties for boats. The entrance to the bay is 330 yards wide and faces south-south-west which renders it susceptible to the *marrobbio* (I, p. 417). This phenomenon, an unforeseen and inexplicable rise or fall of sea-level varying from a few inches to over 3 feet in extent, makes the harbour dangerous by creating violent currents. Winds from the south-west and west-south-west usually cause an appreciable rise in the level of the water in the harbour.

Of the 3,146 people on Lampedusa, no less than 2,000 live in the village 350 yards inland from the north-eastern shore of the main harbour. This settlement has a telegraph service, a small inn, a penal colony with a hospital, and the usual port offices. The main occupation of the islanders is fishing for sardine, anchovy, and sponge. The soils are not naturally fertile and the vegetation consists mainly of a scattered growth of prickly pear, carob, wild olive, and vine. Only the lowest and most sheltered parts are cultivated, the fields being protected by stone walls or by thick hedges of prickly pear. The only exports are fish, pickled or preserved in oil. Short stretches of cart-road lead from Lampedusa village north-eastwards to the cemetery near Pisana bay and northwards in the direction of the new reservoir. A cart-road has probably also been built leading east to the seaplane base at Francese bay. The remainder of the island is served by mule-tracks or paths.

The uninhabited rock of Lampione lies about 10 miles west-north-west of Lampedusa. This rock has a flat top about 750 yards long by 200 yards wide and a greatest height of 130 feet. Its sides are cliffed and almost perpendicular except on the south-east, where a

stone landing-place gives access to a warning light on the summit of the rock.

LINOSA

The islet of Linosa is 23 miles north-east of Lampedusa and 65 miles south-east of Pantelleria. Quadrangular in shape, it measures about 2 miles by $1\frac{1}{4}$ miles and covers an area of 2 sq. miles (Fig. 72). The island is of volcanic origin and has no water-supply other than

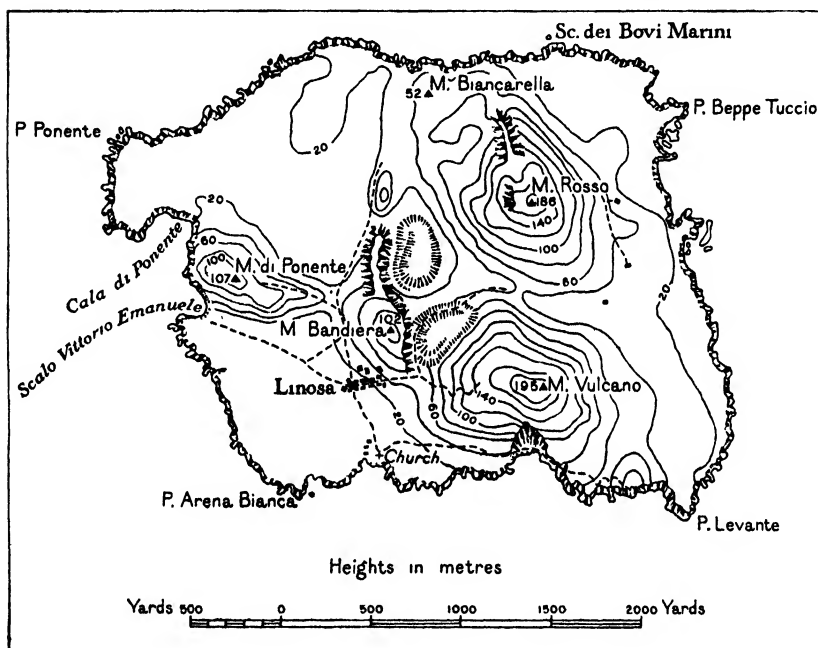


FIG. 72. *Linosa*

cisterns, the largest of which is near the Cala Manarazzo on the north coast. The relief is hilly, especially towards the east where the volcanic cones of M. Rosso (610 ft.) and M. Vulcano (640 ft.) dominate two elliptical craters. Farther west are two small cones, one of which (M. di Ponente) rises to 348 feet. The coasts are low but rocky, and furnish neither a secure anchorage nor any harbour. Landing is usually made at the Scalo Vecchio, a partly ruined mole south of Linosa village, where small boats can go alongside, or at Scalo Vittorio Emanuele, a cove on the west coast.

The island has 336 inhabitants, most of whom live in one village.

This settlement of low, brightly painted houses stands on the gentle slopes of the south-west of Linosa, at about 350 yards from the shore. Much of the flatter areas of the south-west and south-east is cultivated, but shortage of water severely restricts agriculture. The main occupation is the rearing of stock, and especially of cattle. Mule-tracks connect the village to the main landing-places and to the reservoir near the north coast.

ITALIAN ISLANDS IN THE ADRIATIC

APART from the alluvial islands of the Venetian lagoons, the Tremiti form the only archipelago off the east coast of Italy. Nearly all the other Italian islands in the Adriatic lie near the coast of Istria and Dalmatia. These include Cherso, which is nearly twice as large as Elba, and Lussino, which is not much smaller than Pantelleria. The islands, however, support relatively few people and only Sansego is densely populated.

TREMITI ISLANDS AND PIANOSA

Isole Tremiti, known anciently as Diomedae Insulae, are situated about 20 miles north-westward of Rodi and $12\frac{1}{2}$ miles north-north-west of Point Mileto, the nearest point of the Italian mainland. The group consists of the three main islands of S. Domino, S. Nicola, and Caprara, together with the islet of Cretaccio and the rock of La Vecchia, which stretch all told for just over 3 miles in a north-easterly direction (Fig. 73). The archipelago is a detached fragment of the Gargano peninsula, and, like it, consists mainly of porous calcareous rocks. There are depths of between 100 and 200 feet within a short distance of the group. For administrative purposes the Tremiti do not form nor do they fall within a commune. They have served continuously as a penal colony since at least 1792, and most of the agriculture is done by the colonists, which numbered 600 in 1939. Normally, steamers from Bari, Manfredonia, and Rodi call once a week.

San Domino

S. Domino, the largest and highest island, is about $1\frac{1}{2}$ miles long by $\frac{1}{2}$ mile wide and covers an area of just over $\frac{3}{4}$ sq. mile. It is a limestone block rising to 377 feet in the south and declining

gradually northwards. The coasts are for the most part cliffed, steep, and rugged, and contain several caves, one of which, the Grotta Bue Marino in the south-west, penetrates about 75 yards and can be entered in a boat. In 1938 the permanent resident population of S. Domino was 28 persons, most of whom dwelt near the north-east coast. The island is well wooded, since the upper, more level parts

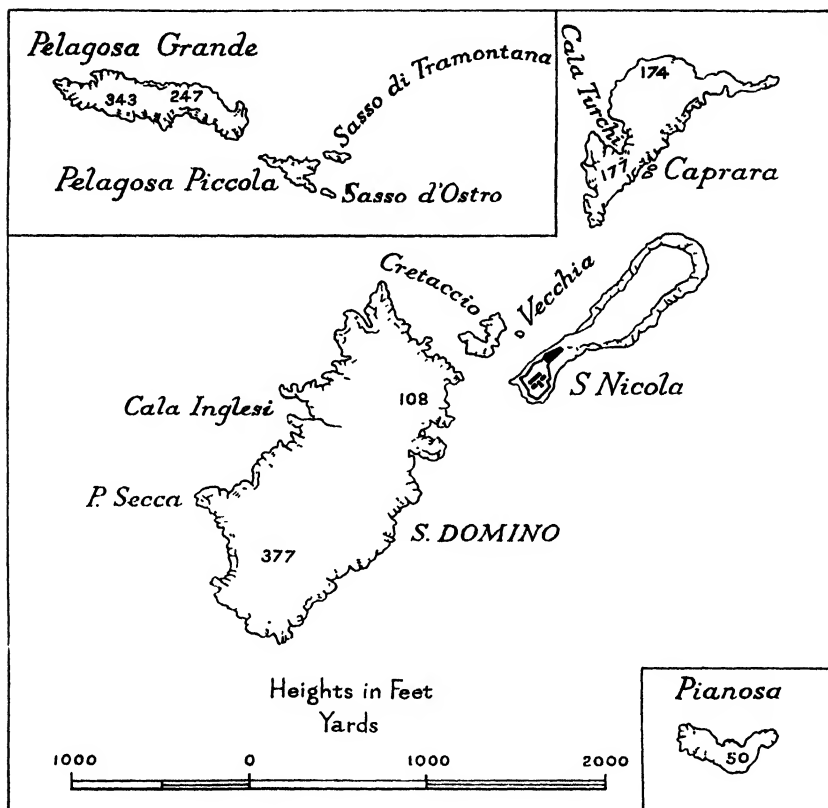


FIG. 73. The Tremiti Islands, Pelagosa Islands, and Pianosa

are planted with vines and the southern slopes with pines. The soil is fertile and good crops of figs, olives, cereals, vegetables, and herbs are also grown. The natural vegetation includes rosemary, mastic, arbutus, myrtle, and a centaury (*Alisso leucado*) peculiar to the island. A channel, 150 yards wide and up to 10½ feet deep, separates the north-eastern end of S. Domino from Cretaccio, a crescent-shaped islet of yellowish limestone, convex to the south-east. About

35 yards off the eastern end of Cretaccio there is a large, blackish rock, the Scoglio La Vecchia.

San Nicola

San Nicola, the easternmost unit of the Tremiti group, is separated from La Vecchia by a passage suitable for vessels of light-draught only. S. Nicola is a narrow, rocky, steep-sided ridge of limestone, about 1 mile long by $\frac{1}{2}$ mile wide and with an area of 80 acres (Fig. 73; Plate 89). Its greatest height, 236 ft., is in the north, whence a flattish tableland, at 180 to 200 feet, stretches southward. The narrower, south-western end of the island has been converted into a fortified enclosure or citadel (Plate 90), which contains the penal settlement and other buildings, including a fifteenth-century church, a former convent, and a signal station. On the south-western side of the citadel there is a landing-place with a pier (about 100 ft. long) for small craft. On the south-eastern side a zigzag road leads down the cliffs to another small landing-place. A submarine cable from the mainland at Point Mileto lands immediately below the signal station. The anchorage lying between the islands of S. Domino, Cretaccio, and S. Nicola is adequately sheltered from the bora and is especially useful for sailing-vessels, since there is no other good harbour between Ancona and Manfredonia. Large vessels can anchor off the south-east coast of S. Domino, the shelter being best nearest to S. Nicola; small vessels can make fast to posts under the citadel, or to posts on Cretaccio and to mooring-buoys in the channels between the islands. The free, resident population of S. Nicola numbers about 360 persons, most of whom are concerned with the care of government projects and with farming. Fishing forms a profitable sideline since the adjacent seas are rich in fish.

Caprara

Caprara, or Capperara, the north-eastern island of the Tremiti group, is an irregular-shaped block of limestone, about 1 mile long and 111 acres in area, and is separated from S. Nicola by a channel about 300 yards wide. The summit of the island is tabular, with a gentle slope to the south, and a precipitous descent in most parts to the sea. The population is not much more than a dozen persons, who are either lighthouse-keepers or farmers. The island takes its name from the capers that formerly flourished upon much of its surface.

Pianosa

The island of Pianosa, although not part of the Tremëti group, is only $11\frac{1}{2}$ miles east-north-eastward of it. Pianosa consists of a low, flat, arid rock, about 50 feet high on its north side and slightly lower in the south. The north coast drops to deep water, whereas the south shore is bordered by a bank extending 150 yards seaward. The island is about 750 yards long (east to west) by 230 yards wide and covers an area of 32 acres (Fig. 73). It is uninhabited except in summer, when fishermen may spend the night there.

PELAGOSA ISLANDS

The small Pelagosa archipelago consists of two islands and several islets and rocks lying in the Adriatic about midway between Gargano promontory and Lagosta. Pianosa is 25 miles to the west-south-west, and Peschici, the nearest point of the Italian mainland, 28 miles to the south-south-west. The group represents the crest of a long submarine ridge running obliquely to the Apennines and Dinaric Alps. The rocks consist mostly of various kinds of limestone, some of which are so flinty, that they emit sparks when struck with a pick. The islands normally have less than 16 inches of rain a year, but lightning is said to be common and on 7 April 1876 it seriously damaged the lighthouse. A strong south-easterly wind, the scirocco, blows for long periods, especially in spring and winter. Grass and trees do not grow on the islands, nor have they animals apart from migrant birds; the adjacent seas are rich in fish.

The main island, Pelagosa Grande, consists of a rugged ridge, about 1,500 yards long by 75 to 300 yards wide, covering an area of 72 acres (Fig. 73). It falls precipitously to the south, from which direction it resembles an immense, ruinous wall; on the north it slopes less steeply and ends in low cliffs. The crest of the ridge rises from 230 feet in the east part to 343 feet in the west, where a rugged pyramidal-shaped hill forms the site of a lighthouse. The usual landing-places are at Spiaggia di Zadlo, a small gravel beach on the south, and at Squero Vecchio, a small cove in the north-west where fishermen haul up their boats in bad weather. In 1921, 21 persons were living on Pelagosa Grande, but since then the light has been made automatic and there are now no residents. Fishermen often land here during the sardine-fishing season. The only road on the island leads from the southern landing-place to the lighthouse.



PLATE 89. *S. Nicola island from S. Domino*

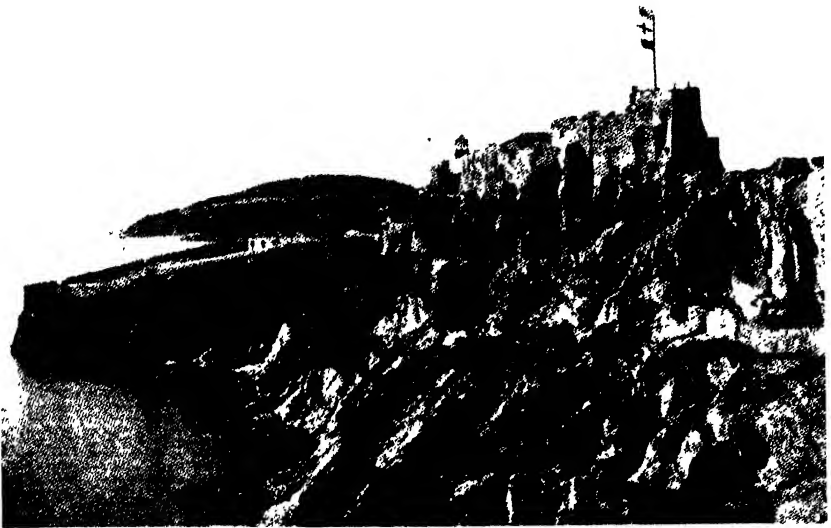


PLATE 90. *Fortress of Monaci, S. Nicola*

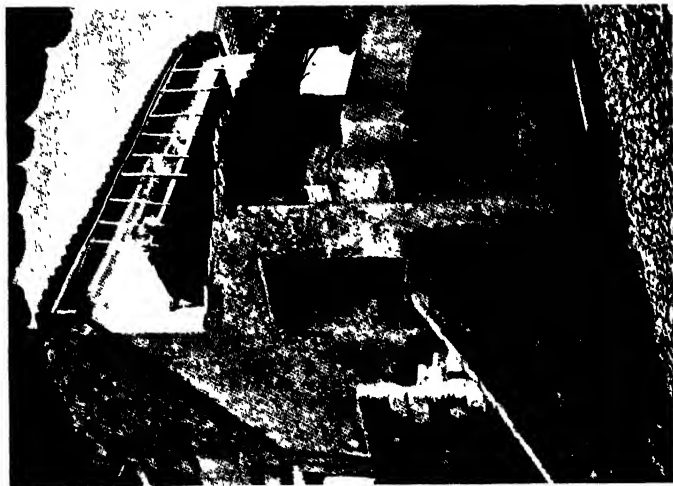


PLATE 91. *Typical house at Caisole, Cherso*

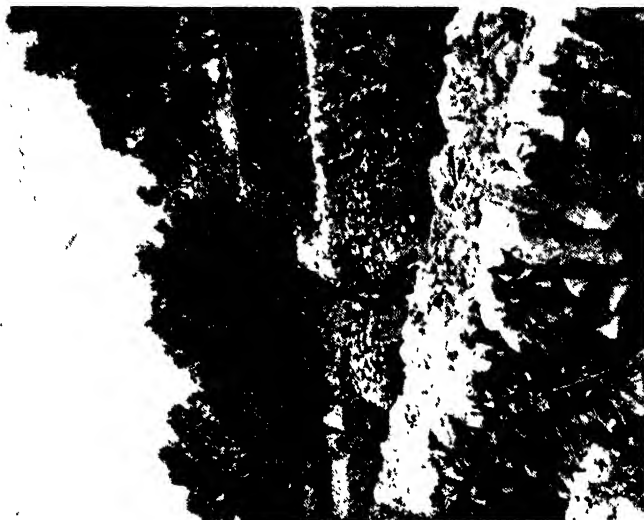


PLATE 92. *Cultivation terraces, Cherso*

Several rocks, including Scoglio Manzi (8 ft.), extend for 320 yards from the western end of Pelagosa Grande.

Pelagosa Piccola, which lies 330 yards south-east of the larger island, has a length of about 440 yards, a maximum height of 127 feet, and an area of $9\frac{1}{2}$ acres. Rocks and islets border it for 200 yards off shore, while 3 miles farther to the east-south-east is Scoglio Caiola, a rock nearly 200 yards long and 18 feet high. Like Pelagosa Grande, all these outlying islets are barren and desolate.

THE LAGOSTA GROUP

The Lagosta archipelago lies a few miles west of Mljet, the south-easternmost of the larger islands off the Dalmatian coast, and $8\frac{1}{2}$ miles south of Korcula island. The group is little more than 62 miles from the Italian mainland at Gargano, but is twice that distance from Zara, the capital of the province to which it belongs. Its total area is about 20 sq. miles; of this Lagosta alone comprises 17 sq. miles, and the four islets of Cazza, Prijestap, Mrcara, and Cazzio! most of the remainder (Fig. 74). The islands are detached fragments of the calcareous mountain ridges of the mainland and, like them, have been much affected by the solvent action of rainwater. In spite of the wooded nature of the islands, their total population in 1938 was only 1,945 persons.

Isolotti Lagostini

Two groups of islets and rocks interrupt the channel, $16\frac{1}{2}$ miles wide, between Mljet and Lagosta island. The Lagostini, or eastern group, is composed of nine uninhabited islets or rocks, at their nearest about 8 miles west of Mljet. The highest islet (Scoglio Glavato) rises to 72 feet. The western group of Isolotti Lagostini extends for about $3\frac{1}{2}$ miles off the north-eastern extremity of Lagosta island, of which it is a structural continuation. This group consists of the four main islets of Mladina, Casvanizza (Cesvinica), Crucizza (Krucica), and Stomorina (Stomarine) and ten smaller islets and rocks, which range in height from a few feet up to 272 feet above sea-level. Although the larger islets are covered with bushes they are not inhabited.

Lagosta Island

Lagosta, or Lastovo, is an irregular, oval-shaped island, with a maximum length from east to west of $5\frac{1}{2}$ miles, a maximum width of $3\frac{1}{2}$ miles, and an area of 17 sq. miles (Fig. 74). The relief, although

mountainous, is not high, the main summits being M. Hum (1,368 ft.) in the centre of the island, and M. Plessevo (1,362 ft.) about $\frac{1}{2}$ mile to the south-west. Almost everywhere the slopes are steep, especially to seaward, and the rugged nature of the topography is much increased by deep, steep-sided hollows or basins. These enclosed basins, formed by solution of the limestone, are known as polje; they reach a considerable size, Vino polje being 3,300 yards long by 1,100 yards wide, and Zle polje slightly larger. The floors of the

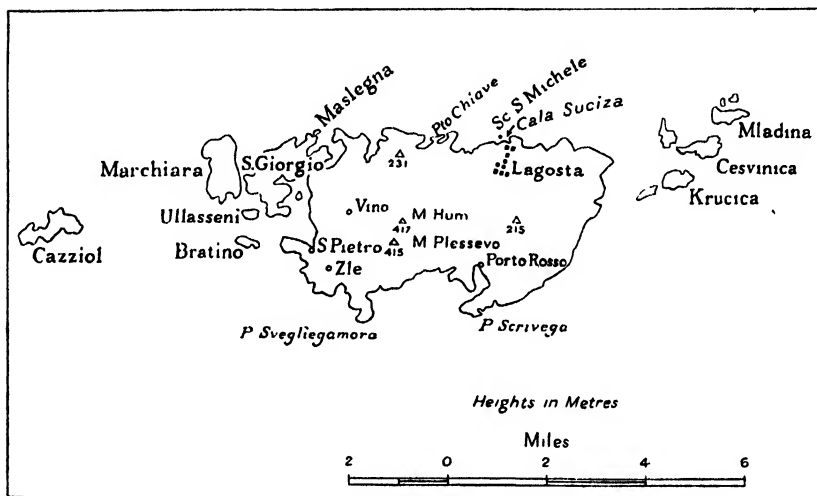


FIG. 74. *The Lagosta Group*

basins are usually covered with terra rossa, a fertile residual soil. The porous rocks make water-supply a problem except in the deeper polje. Since 1920 the Government has had built a deep bore with a motor-pump, and a communal cistern as well as several wells for watering cattle in the more rural parts of the island. These schemes have relieved the great droughts that occasionally afflicted Lagosta in the summer half-year. The rainfall in winter and the fertility of the soils allow the growth of forest and bushes which clothe most of the uncultivated parts except the precipitous seaward slopes. Pine and oak flourish on the higher areas, including the summit of M. Hum, while rosemary is especially common among the bush-growth.

The coasts of Lagosta are bold and, except in the south-east, much indented. The south-east coast between Point Noriga and Point Scrivega, $3\frac{1}{4}$ miles to the south-west, rises steeply from deep water and lacks landing-places. The southern coast consists of a

large bay, at the north-east corner of which is Porto Rosso, a small harbour, deep and almost land-locked. The narrow entrance has a depth of $19\frac{1}{2}$ feet; the bay deepens to between 30 and 36 feet at its centre and has space for large vessels. The anchorage afforded is safe during the bora and westerly winds, but is much exposed to winds from between south-west and south-east. The west coast of Lagosta trends north-westwards for 2 miles between Point Svegliegamora and Point S. Pietro (Baski Rat), and then recedes to form with the off-lying island of S. Giorgio (Prijestap) the two harbours of Porto Lago Grande and Porto Lago Piccolo.

Porto Lago Grande is entered by a deep navigable channel about 500 yards wide between the south-western extremity of S. Giorgio island and Point S. Pietro. Off the entrance to this channel, and dividing the approach to it into three passage-ways, are the small wooded islets of Ulasseni (295 ft.) and Bratino (362 ft.). Near the centre of the northern part of Porto Lago Grande is another small islet (Raffaele; 82 ft.) which divides the anchorage into a northern and southern section, each having 16 to 26 fathoms. Although the anchorage is mainly bordered by a steep, wooded coast there are coves with bay-head beaches on S. Giorgio island and on the mainland at the south-eastern side of the harbour. Small craft moor in these coves.

A narrow, shallow channel between S. Giorgio island and Lagosta allows small craft to pass from Porto Lago Grande to Porto Lago Piccolo. This harbour is protected on the west by S. Giorgio island and by the bush-covered islet of Maslegna (105 ft.). It is entered by a clear, deep channel, about 300 yards wide, which leads to an almost land-locked anchorage with depths of up to 20 fathoms.

The north coast of Lagosta east of Porto Lago Piccolo is indented by many small bays and coves. The cove of Porto Chiave contains the anchorage chiefly used by coasting vessels, since it is near Lagosta village and is partly protected on the north by the small islet of Chiave (131 ft.). Three-quarters of a mile to the east is Scoglio S. Michele, a low rock with a quay at its western end; the shallow water between it and the main island forms a small haven, which affords shelter for small vessels from south-westerly winds. From recent photographs it would appear that all the southern side of the rock has been quayed, and that the rock has been joined to the main island by means of a wide mole with a tall wall on its eastern side, thus sheltering on east and north an expanse of shallow water. About 400 yards east of this small port is Magazzini (Suciza)

cove, which forms the harbour for Lagosta village; here there is a depth of 8 to 19 feet, but the anchorage is indifferent.

The importance of Lagosta has long depended on the shelter its main bays afforded to sailing-ships in the Adriatic. As early as A.D. 997 an old fortified town, built in the creek of Ubli close to a slightly brackish but potable water-supply, was razed to the ground by the Venetians. Subsequently Lagosta belonged at various times to mainland republics, such as Ragusa, and to France, Austria, and Italy. In 1813, during the Napoleonic Wars, the English occupied the island with the intention of turning it into a naval base. Since 1921, when the island was ceded to Italy, the population has increased from 1,499 to 1,769 persons (1938), nearly all of whom dwelt in Lagosta village. This village stands at about 315 feet on the landward slopes of one of the highest hills on the north side of the island. Most of its buildings are hidden from the sea as the former danger from pirates caused the villagers to erect their houses in a basin a short distance from the seaboard. The village is reached by a steep, stepped road, the only roadway in the island. Many of the streets in the village are flights of steps, which turn into raging torrents after heavy rain. Most of the inhabitants are peasants who combine farming with fishing. The vine and olive flourish, while fishing goes on all the year. Although the island contains sixty-four fertile valleys that could be cultivated, only a relatively small proportion of it is under crops. This is largely due to the lack of labour, and it is usual to bring in peasants from the neighbouring mainland to assist with the harvest. There seems no doubt that Lagosta is capable of supporting at least five times its present population. The inhabitants have retained their local customs, especially dances, to a remarkable degree.

Lagosta is visited regularly by steamers from Venice, Fiume, Zara, Rodi, and Bari. There is a radio-telegraph station on the island, which is connected by submarine cable (from the shore west of Scoglio S. Michele) to Korcula island.

Islets west of Lagosta. S. Giorgio, or Prijestap, is an irregular-shaped island covering an area of just over 1 sq. mile and supporting a few dozen people only (20 inhabitants in 1921). It is hilly (508 ft.), and for the most part steep-sided and wooded. About 150 yards west of S. Giorgio is the oval-shaped islet of Marchiara (Mrcara) which has an area of $\frac{3}{4}$ sq. mile. It consists mainly of two wooded conical hillocks, the southern of which rises to 397 feet. These hills drop steeply to the sea, especially on the south-western side of the islet.

Marchiari and the smaller Marchiara Piccolo (52 ft.), lying about $\frac{1}{2}$ -mile to the north-west, have no permanent residents. The submarine ridge on which Marchiara stands rises above the sea again $2\frac{1}{2}$ miles westward in the islet of Cazziol (Kopiste). The various hills composing the islet rise to between 180 and 305 feet and are covered with bushes and stunted trees. Cazziol, which has an area of $\frac{1}{4}$ -sq. mile, is not inhabited. A channel, nearly $8\frac{1}{2}$ miles wide and for the most part deep, separates Cazziol from Cazza (Sušac), the westernmost of the Lagosta archipelago. With an area of nearly $1\frac{1}{2}$ square miles and a summit height of 797 feet, Cazza is the largest and most rugged of these minor islands. The northern part of the island is a high, steep ridge, alined east to west, and dropping steeply to seaward, especially on the north; a low col connects this ridge with a long, narrow, irregular promontory trending south-westwards. On the south-eastern side of this promontory are some small bays in which fishing-boats can shelter from northerly and westerly winds. Formerly Cazza was visited by shepherds in summer only, but in 1921 it had a resident population of 13 persons. In 1938 the total population of these off-lying islets exceeded 100 persons, and it is probable that 20 to 30 of these lived on Cazza.

CHERSO

Of all the Italian islands only Sicily and Sardinia are larger than Cherso, which is a limestone ridge about 35 miles long by $1\frac{1}{4}$ to $6\frac{3}{4}$ miles wide, and 154 sq. miles in area (Fig. 75). The ridge rises to over 1,500 feet throughout most of northern Cherso and attains 2,090 feet at M. Sis near the narrowest part of the island. In central Cherso there are two main hill-blocks separated by a wide bay and by a lowland containing Lake Vrana. The ridges of the eastern hills rise for the most part to between 900 and 1,100 feet and culminate at 1,406 feet in M. Persca; the summit of the western ridge keeps at well over 1,000 feet and attains 1,585 feet in M. Chelm. Southern Cherso is much lower; few points exceed 700 feet, while in the extreme south the greater part of the island is less than 250 feet above sea-level.

The elongated, irregular shape of Cherso gives it a coastline of 116 miles. There is, however, a great difference between the eastern and western sides of the island; the former is exposed to the bora and is almost uninhabited, while the latter has several ports and anchorages and is less desolate. The southern part of the west

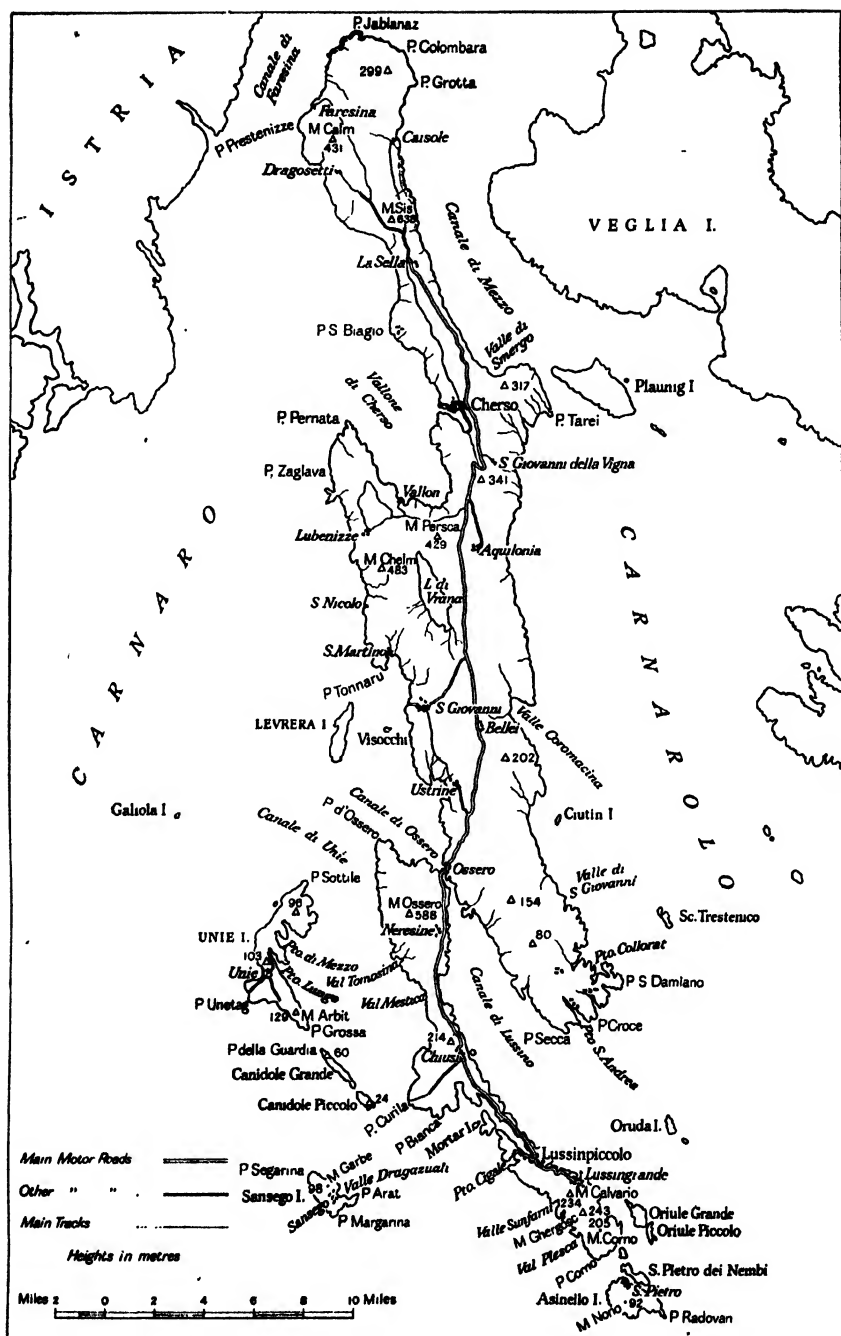


FIG. 75. *Cherso, Lussino, and off-lying Islands*

coast borders the Canale di Lussino, which extends from the islet of Oriule north-westward 13 miles to Ossero. In this distance the channel decreases from $2\frac{3}{4}$ miles to about 20 feet in width and from 34 fathoms to a few feet in depth. Its south-eastern approach is bordered by the islets of Palazzuoli (20 ft.) and Oruda (46 ft.), which lie $4\frac{1}{2}$ and 4 miles respectively off the southern extremity of Cherso. A bank with many shallow patches stretches from Oruda islet 3 miles north-westward to Secca Croce, which separated by a mile-wide, navigable channel from Point Croce on Cherso. The southern coast of Cherso near Point Croce is rugged and deeply indented, but rises gradually inland to woods and cultivated areas. The chief inlet here is Porto S. Andrea, which has sufficient space and shelter for small vessels.

The south-western coast of Cherso, from Point Secca to Ossero, 7 miles north-westward, is backed by gently sloping country and has several anchorages, including Porto Caldonte which affords shelter from all winds. Small craft intending to pass through the narrow strait at Ossero can wait in a small basin, with a depth of 6 feet, south of the narrows. This strait between Cherso and Lussin islands is between $19\frac{1}{2}$ feet and 26 feet wide opposite Ossero town, where it is crossed by a swing bridge. Having a depth of nearly 8 feet, it is available for small craft which proceed along it to Porto Vier, the southern end of the Canale di Ossero. Here there are two small moles and several masonry bollards for small craft, and, to the north, anchorage for large vessels. At the northern approach to the Canale di Ossero is the deep bay of Porto Ustrine, near the head of which small craft can anchor. Four and a half miles farther north is Porto S. Martino, which is partly protected by the off-lying islet of Levvera (220 ft.) and has a small mole with some masonry bollards at the village near the head of the bay. Northwards the coast rises steeply inland for most of the distance to Point Pernata, which forms the western entrance-point of the large bay of Cherso. Since this bay is exposed to winds from a northerly quarter, the main harbour is the Porto di Cherso, an inlet about 2,300 yards long by 450 to 800 yards wide on its north-eastern side. This inlet is well sheltered and has depths of up to 26 fathoms in the entrance and of 4 to 13 fathoms off the town of Cherso. A masonry mole, about 495 feet long, with 12 to 18 feet alongside, projects from the southern part of the town. Just north of the mole is a small natural harbour, which is about 12 feet deep in its middle. This creek has been further protected on the south by two small moles, and has been improved

by the building of a stone quay and several bollards. In front of the town there are also a basin, 1 to 6 feet deep, for small craft and two yards for the construction and repair of coasting vessels.

The west coast of the island north of Cherso bay has no notable inlets and is backed by steep limestone slopes. Between Point Prestenizze and Point Jablanaz the coast forms the east side of the Canale della Faresina, which connects the Great Carnaro channel with the gulf of Fiume. The Canale della Faresina, which has a minimum width of $2\frac{1}{2}$ miles, affords anchorage for coasting craft in the cove near the small village of Faresina. The north coast of Cherso, between Point Jablanaz and Point Grotta, is remote from the main road of the island. The east coast between Points Grotta and Tarei, a distance of $12\frac{1}{2}$ miles, is high, barren, and steep, and being exposed to the bora has no good anchorage. There is, however, a mole near the village of Caisole. The coast between Points Tarei and Coromacina is equally inhospitable, although small craft can shelter from the scirocco in Lucovo creek. The coast between Points Coromacina and S. Damiana, 10 miles to southward, contains several small bays. None, however, is suitable for large vessels, and only Porto Colorat in the extreme south affords shelter from all winds, even for small craft. The whole of southern Cherso is remote from the main road of the island.

Although Cherso has a considerable rainfall in the winter half-year, the porous nature of the rocks and the steepness of the island cause surface water to be scarce throughout the warmer months. Lago di Vrana is a notable exception; this lake, which occupies the floor of a steep-sided, enclosed basin, is 3 miles long by $\frac{3}{4}$ -mile wide, has an area of over 2 sq. miles, and a maximum depth of 256 feet. The surface of the lake is only 53 feet above the sea, from which it is separated by a narrow ridge 554 feet high.

Upon much of the higher steeper parts of Cherso, blocks of whitish-greyish limestone show at the surface. In the most exposed areas only dwarf bushes grow in the crevices, with an occasional tree, stunted and deformed by the wind. There are, however, large areas of taller *macchia* and tree-growth especially on the west side of the island. The main trees are the chestnut, ilex, pine, and ash; the main bushes are the sage, myrtle, and lilac. Flowers abound in season, including the pyrethrum (*crisantemo*), which is dried and exported for use as an insecticide.

In 1938 the total population of the island was 8,617 persons, of which 5,082 lived in the seven main coastal settlements. The chief

town and capital is Cherso (3,502 inhabitants), which stands on the north side of the Porto di Cherso. It is on the main north-south road of the island and in addition has a telegraph service. The chief village in the south is Ossero (370 inhabitants; Plates 93, 94), until recent times by far the leading settlement of the island. Standing on a small, low peninsula, dominated by its fifteenth-century cathedral, Ossero commands the narrow strait between itself and Lussino island (Fig. 75). Details of the ten other sizeable villages on Cherso are given in the following list, in which the figures in brackets denote the total population of the village and its immediate neighbourhood.

	<i>Height above sea-level in feet</i>	<i>Population</i>
Caisole	426	535 (969)
Dragosetti	915	341 (460)
La Sella	1,217	138
Vallon di Cherso	7	270
Lubenizze	1,240	178 (506)
Aquilonia	784	465
S. Martino in Valle	10	269 (584)
S. Giovanni di Cherso	403	382 (479)
Bellei	433	465
Ustrine	321	212

The main occupations of the islanders are farming and fishing. Olives and other fruits flourish, and vegetables, such as French beans, salad crops, and artichokes, are grown near the villages. The cultivations are usually on terraces or on walled areas. Fishing is a profitable occupation, especially in northern Cherso, where from June to October tunny nets are set in Faresina channel. In Cherso bay there is much fishing by means of nets, and the southern part of the harbour is used as oyster beds. Minor industries include the building and repairing of ships at Cherso town and the quarrying of white limestone—much used at Venice—near the village of Ossero (Plates 91, 92).

A motor-road traverses the length of Cherso island from Dragosetti in the north to Ossero in the south. Minor roads, also motorable, branch off this highway to the larger villages, most of which have public automobile services. The town of Cherso has regular steamship connexions with Venice, Bari, Pola, Fiume, Ravenna, and Lussinpiccolo. Ships on the Fiume-Lussinpiccolo service also call at Caisole, S. Martino in Valle, and Ossero, while the latter village also has a local service to Cherso. The telegraph system serves the main villages; three cables run from Faresina cove in the north to

the Istrian coast; others run from Porto di Cherso to Porto Albona, and from Point Tarci to Krk island.

LUSSINO

Isola Lussino, the second largest of the off-lying islands of the province of Pola, covers an area of nearly 29 sq. miles. It has the elongated shape characteristic of the Dalmatian islands, being 24 miles long (north-south) and never more than 3 miles wide (Fig. 75). Together with Cherso and various other islands in its vicinity it was transferred from Austria to Italy after the end of the War 1914-1918.

The island is a continuation of the Cretaceous ridges of Istria; its porous limestone soils are steep and rocky and show strongly the solvent action of rain water. It consists mainly of three hill-blocks separated by two narrow isthmuses. The northern block, which is $2\frac{1}{2}$ miles wide by 5 miles long, rises to 1,929 feet in M. Ossero, whence the land drops steeply westward, but falls more gently eastward to a flattish area at between 400 feet and 250 feet above sea-level. The summit of the main ridge declines to about 900 feet near its northern and southern edges. From the neighbourhood of S. Giacomo southwards to M. Pollanza (702 ft.) the island forms an isthmus about $\frac{3}{4}$ -mile wide and seldom more than 650 feet high. South of M. Pollanza the island widens out into a low hill-mass about $2\frac{1}{2}$ miles in diameter; here a few points exceed 450 feet, but much of the western parts are less than 100 feet above the sea. This hilly region merges southward into a narrow isthmus that stretches for $4\frac{1}{2}$ miles to Lussinpiccolo. The isthmus consists of a series of hillocks, seldom above 300 feet high and 750 yards across, alternating with low-level cols in parts less than 30 yards from shore to shore. To the west, another ridge is represented by several islets and by the irregular peninsula north of Porto Cigale. South of Lussinpiccolo there stretches another hill-mass forming an oblong about 5 miles long by $1\frac{1}{2}$ miles wide, which is traversed lengthwise by a ridge seldom less than 650 feet high and in parts over 790 feet.

Lussino has a coastline of 95 miles, which borders on the east the Canale di Lussino and Carnarolo channel, and on the west the Canale d'Unie, the Great Carnaro channel, and the Adriatic proper. The east coast is indented but high, and since most of the inlets are exposed to the bora, it affords no good anchorages. Several islets lie off the southern end of this coast. The limestone islets of

Oriule Grande (108 ft.) and Oriule Piccolo (37 ft.) are almost joined and shelter on the west a channel with good anchorage in 22 fathoms. These islets support a few inhabitants, but much of their surface is bush-clad. Off the south of Lussino are Asinello island (302 ft.) and the steep, wooded islet of S. Pietro dei Nembi (206 ft.). In between the two islands is a channel about 400 yards wide and from 12 to 30 feet deep which forms a good harbour. On the north shore are the Health office, several bollards, and a short mole (in shallow water), while on the south, at the village of S. Pietro dei Nembi (484 inhabitants), are two shallow basins for small craft.

The west coast of Lussino has numerous anchorages. Between Point Corno and Porto Cigale, $4\frac{1}{2}$ miles north-westward, there are several coves, but the ground rises steeply inland, and much of it is covered with bushes. Porto Cigale is well sheltered and is suitable for vessels of moderate size. There are depths of 9 to 12 fathoms in the anchorage, while on the shore are numerous bollards. The coast between Porto Cigale and Point Curila is much lower and more deeply indented than elsewhere in Lussino. The main inlet is the long, narrow Val d'Augusto, at the head of which is Porto Lussinpiccolo. The navigable entrance (*Bocca vera*) to this inlet lies north of the off-lying islets of Colludarz (174 ft.) and Mortar (82 ft.); the channel south of Colludarz islet is suitable only for boats. Porto Lussinpiccolo, which is considered one of the best and most convenient harbours in the north Adriatic, has depths of 11 to 18 fathoms in its entrance and of 5 to 19 fathoms in the Val d'Augusto. The eastern shore near the head of the harbour in front of the town has been quayed and a protecting quay, about 600 feet long with just over 23 feet alongside, has also been built. Other facilities include a yard for building and repairing small vessels (probably up to 600 tons) and a supply of fresh provisions (Plate 95).

Between Point Curila and Point d'Ossero, the northern extremity of Lussino, the coast is backed for the most part by steep rather desolate hills. Small vessels can find shelter from southerly winds in Porto Lovo and from easterly winds in Tomosina cove, but there are no well-sheltered anchorages. The large and partly land-locked expanse of water between this coast of Lussino and the islands of Unie and Canidole is much frequented by fishing-craft since the natives regard it as a safe refuge. Known as the Canale d'Unie, this area has regular depths of 24 to 26 fathoms.

Much of Lussino island has a rainfall of 30 to 40 inches a year, the greater part of which falls between early October and late March.

From June to September when rain seldom occurs and 55 of the days are usually cloudless, the porous soils give Lussino an arid appearance and drought becomes serious. There is no running water on the island, nor any permanent surface-water except a few insignificant pools near M. Ossero. Water can usually be obtained by boring to a depth of 30 to 100 feet in suitable localities on M. Ossero and near Lussingrande, but wells in the latter area are liable to be contaminated by marine infiltration. The relatively barren aspect of the island reflects the aridity of the soils; the woods consist largely of *macchia* of myrtle, broom, and *arbutus*, while the chief tree is the olive.

In 1938 Lussino had 6,275 inhabitants. Of these 1,992 lived in the south of the island, mainly near Lussingrande (1,508 inhabitants) and S. Pietro dei Nembi. The former settlement is a winter health resort and has a few hotels. Most of the other islanders dwell near Lussinpiccolo, which has a population of about 3,000 persons. The town contains several large hotels and, owing to the mildness of the winters, is a popular health resort. Porto Cigale, in reality a suburb of Lussinpiccolo, has several villas and bathing establishments. The only large villages in northern Lussino are Chiusi Lussignano (421 inhabitants) and S. Giacomo di Neresine (about 500 inhabitants).

The main occupations of the islands are fishing, farming, and catering for visitors. The olive is the main crop, but the vine, prickly pear, date palm, American agave, carob, eucalyptus, orange, and lemon can also be grown. Much of the northern part of the island is hilly and barren, but the southern part contains considerable patches of cultivation, although most crops must be sheltered from the bora by stone walls. The *macchia* and grass provide pasturage for flocks and wool is exported. Porto Lussinpiccolo is the main fishing centre, but the inhabitants of all the coastal villages take an active part in the industry. The building and the repair of small craft occupy a few persons.

The land communications of Lussino depend almost entirely on a motor-road which runs from near Ossero in the north to Lussingrande in the south. Villages lying away from this road are served only by cart tracks and paths. There is a telegraph service which is connected by cable to the mainland and to the off-lying islands of Asinello, Sansego, Unie, and Silba. The towns of Lussinpiccolo and Lussingrande also have a telephone service. Steamship connexions are good and regular, Lussinpiccolo being a port of call on the following lines: Venice-Gravosa, Venice-Bari, Trieste-Zara, Fiume-Ancona,

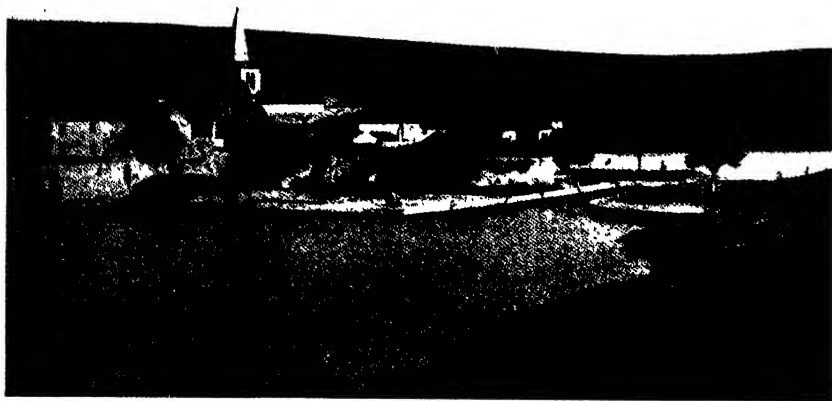


PLATE 93. *Ossero: the bridge between Cherso and Iussino*



PLATE 94. *Ossero, Cherso*



PLATE 95. *Lussinpiccolo and the Canale d'Augusto*

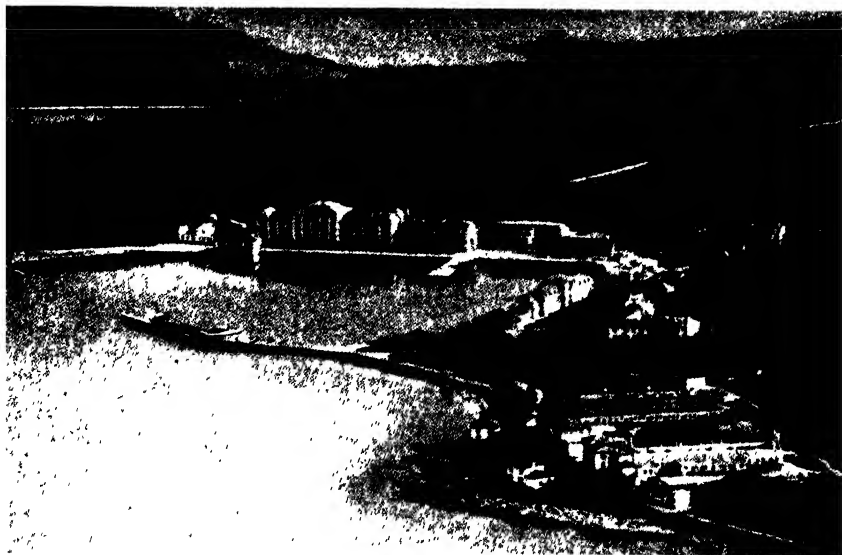


PLATE 96. *Porto Brioni*

Fiume-Lagosta, and Lussinpiccolo-Fiume. The daily seaplane service from Trieste to Ancona also called at Lussinpiccolo. There is one canal on the island. This was started in 1934 and is probably not more than 20 yards long; it connects Porto Lussinpiccolo with the Carnarolo channel, thereby allowing fishermen to reach more easily and safely the rich fishing-grounds off the east coast of Lussino.

ISLANDS WEST OF LUSSINO

The small Canidole group and the islands of Unie and Sansego lie in the Adriatic a short distance west of Lussino.

Unie

Isola Unie lies about 6 miles west of Lusino and about 1 mile north-east of Canidole Grande (Fig. 75). Of an irregular shape, the island has a maximum length of $5\frac{1}{2}$ miles, a greatest width of $1\frac{1}{2}$ miles, and an area of $6\frac{1}{2}$ sq. miles. It is composed of a series of low limestone hills, with a north-west to south-east alinement, the longest or southernmost of which rises to 453 feet near M. Arbit. West of the latter ridge stretches a wide, gently undulating plain known as *il Campo*. The higher parts of the island consist of limestone, but the Campo is covered with a continuous layer of sand up to $6\frac{1}{2}$ feet in thickness. A few patches of sands occur elsewhere on the western side of the island, but they are rare on the south-east. The coasts of Unie, 22 miles in length, are for the most part low and grade seaward into a low foreshore of limestone, deeply furrowed by crevices. The coast east of M. Arbit and on parts of the headlands north of it is cliffed and is remarkable for several deep, narrow creeks which run 30 and even 40 yards into the cliff face. One such creek near Point Grossa is 50 feet wide and about 75 yards long, of which length half is occupied by the sea. Porto Lungo, $2\frac{3}{4}$ miles north-west of Point Grossa, affords shelter to small craft from the scirocco and has been improved by the building of a small mole and bollards. The other inlets on this side of Unie are sheltered from westward, but are exposed to the south-east. The bay on the south side of the island, between Points Grossa and Unetag, is sheltered from the bora. The coast of the Campo is low, gently sloping, and fringed with a pebbly beach; a low scarp marks the junction of the limestone shore and the sandy interior.

The rainfall of Unie (about 33 inches a year) comes mostly in the winter half-year, the rainiest periods being October–November and

March–April. Since it is not sufficient to form springs, the water-supply of the island is derived from the collection of rain-water in cisterns. The vegetation of Unie consists mainly of macchia and grasses. The true macchia survives mainly in the north, where various bushes, such as oaks, mastic, juniper, myrtle, and heath, grow almost into trees. Elsewhere on the higher areas the outcrop of limestone only supports a low, stunted growth in which juniper, myrtle, mastic, and turpentine predominate. On the sandy areas various grasses form meadows and pastures.

Between 1921 and 1930 the population of the island decreased from 783 to 692 persons. Nearly all the islanders dwell in Unie village, a small cluster of about 200 houses, facing the main bay of the west coast, and near to the farmlands of the Campo. The houses are built in a uniform style with an upper story close beside a narrow beach up which boats can be hauled. By far the chief occupation is farming. Only the olive and the vine are grown on the limestones, but on the sands wheat, maize, vegetables, apples, pears, peaches, and various other fruit also flourish. The meadows, which are entirely confined to the sands, give rise to a stock-rearing industry, which includes several hundred sheep and swine, and a few goats. Much fishing is done and there are two small factories for the canning of sardines in olive oil.

The internal communications of Unie are by means of mule-tracks and paths, there being over 100 donkeys as well as a few horses and mules in use on the island. Cart-tracks exist only near Unie village. The external connexions of the island, trade, postal, and telegraphic, are mainly with Lussino, either via Sansego or direct from Lussinpiccolo.

Isole Canidole

The Canidole group consists of two islets, Canidole Grande and Canidole Piccola, which are only 300 yards apart and are connected by a submarine ridge not more than 18 feet deep. Canidole Grande covers less than $\frac{1}{2}$ sq. mile and has a coastline of $4\frac{1}{2}$ miles (Fig. 75). It is a narrow ridge of limestone rising to 197 feet near its northern end. Sands cover part of the western side and patches elsewhere, and form fertile areas on the edge of the rocky, sterile limestones. The lesser island of Canidole Piccola covers nearly $\frac{1}{4}$ sq. mile and rises to 157 feet. The whole of its surface, except the shore and a few limestone hillocks, is covered with thick sands which weather into smooth, gentle slopes. The coast of both islands are low and little

indented; where sands occur the waves have worn them back to form low cliffs at the inner edge of the shore. Since neither island has springs, the water-supply comes from cisterns. The larger island supports 145 people and the smaller 80 people, most of whom live in simple houses with no upper story. The islanders obtain a living from farming, the vine, other fruits, and vegetables being grown on the sands, and the olive and vine on the limestones. In addition, a few dozen sheep and swine are kept. All connexions, trade or otherwise, are with Lussino and Sansego.

Sansego

A deep channel about $2\frac{3}{4}$ miles wide separates Sansego from the southern end of the Canidole group. The island, which is irregular in shape, has a greatest length of $1\frac{3}{4}$ miles, a maximum width of $1\frac{1}{2}$ miles, and an area of $1\frac{1}{2}$ sq. miles (Fig. 75). Although aligned from north-west to south-east parallel with the relief trend of the Canidole and Unie, it differs markedly from them in relief and structure. The summit of Sansego is relatively flat, and from a distance appears as a small plateau; for the most part it lies at 120 to 250 feet above sea-level, while M. Garbe, the highest point, is 321 feet in height. The Cretaceous base of the island is covered with a large mass of sands as thick as 300 feet in parts. These sands give the island a strange appearance since the terraces made in them for agriculture are soon eroded by rains. The whitish, rocky aspect, typical of Lussino and Cherso, is here replaced by an expanse of vineyards and fruit-trees. The sands, too, retain rainfall, and in years of long droughts the Unie and Canidole islands obtain water from Sansego. The coasts, $7\frac{1}{2}$ miles long, are steep and bold except at the headlands which are bordered by banks. The main inlet, Dragazuali cove on the north-east side of the island, is suitable only for small vessels, but affords no protection from the bora. A small, silted up, artificial harbour, formed by two moles, one of which is ruinous, is situated on the north-western side of the cove. Shelter from the bora may be found off the south-west coast in the lee of M. Garbe, and, for small craft, in Porat cove near the north-western end of the island.

In 1938 about 1,656 people were living on Sansego, which then supported 1,220 persons to the square mile. This density, remarkable for an Italian Adriatic island, arises solely from the fertility of the sands, which are largely under vines and other fruits. Most of the islanders live in Sansego village, a collection of small houses at Dragazuali cove, which includes a church and a telegraph office.

Besides farming the people do much fishing, especially for sardines, and fish, together with wine and fruit, form the chief exports.

BRIONI ISLANDS

The Brioni group consists of two main islets and numerous rocks and smaller islets which together cover an area of $2\frac{3}{4}$ sq. miles (Fig. 76). The archipelago forms the western side of the Canale di Fasana which separates it from the mainland of Istria near Porto Fasana and Pola. The islands are composed of white, crystalline limestone that has been eroded by waves into a rugged coast, much indented by numerous small coves. The larger islets are between 50 and 189 feet high and are, for the most part, a pleasant mixture of low bushes, woods, meadows, and gardens. The water-supply is obtained by means of a submarine pipe-line from springs at Calisano near Porto Fasana on the mainland. The coastline of the group is about 20 miles long. The northernmost island, Brioni Minore, almost encircles, on its southern side, the inlet of Porto S. Nicolo, which affords anchorage to coasting vessels in a depth of about 24 feet. The Canale Stretto, a channel about 100 yards wide and at least $7\frac{1}{2}$ feet deep, separates this island from Brioni Maggiore. The latter consists mainly of a great park, in which are game of numerous kinds, including deer and moufflon. The only harbour on Brioni Maggiore is at the head of a small inlet on the east coast facing the Canale di Fasana. It is protected by two masonry breakwaters, the one extending for about 600 feet from the north shore of the inlet and the other for about 350 feet from the east side. The entrance between the heads of the two breakwaters is about 450 feet across and has a depth of about 22 feet. A landing-mole projects from the southern side of the harbour near the large hotel. At the extreme south of Brioni Maggiore there is another landing-place, which consists of a pier, about 200 feet long and with 12 feet of water at its head, extending from the western shore of the inlet of Val Terra Alta.

In 1938 the total population of the group was 310 persons, of whom 241 lived on the largest island. The numerous islets west of Brioni Maggiore and Brioni Minore are uninhabited, and, with few exceptions, are not wooded. The main village is Porto Brioni, which was a resort in Roman times. To-day, after several centuries of decay, the tourist industry has been revived and the waterfront is lined with several hotels, one of which has 265 bedrooms. In addition there are several palatial villas on the larger island. Apart from

a little fishing, catering for tourists occupies the islanders. There are excellent facilities for hunting game, fishing, bathing, and sports, including polo and golf. Porto Brioni (Plate 96) has a telegraph and

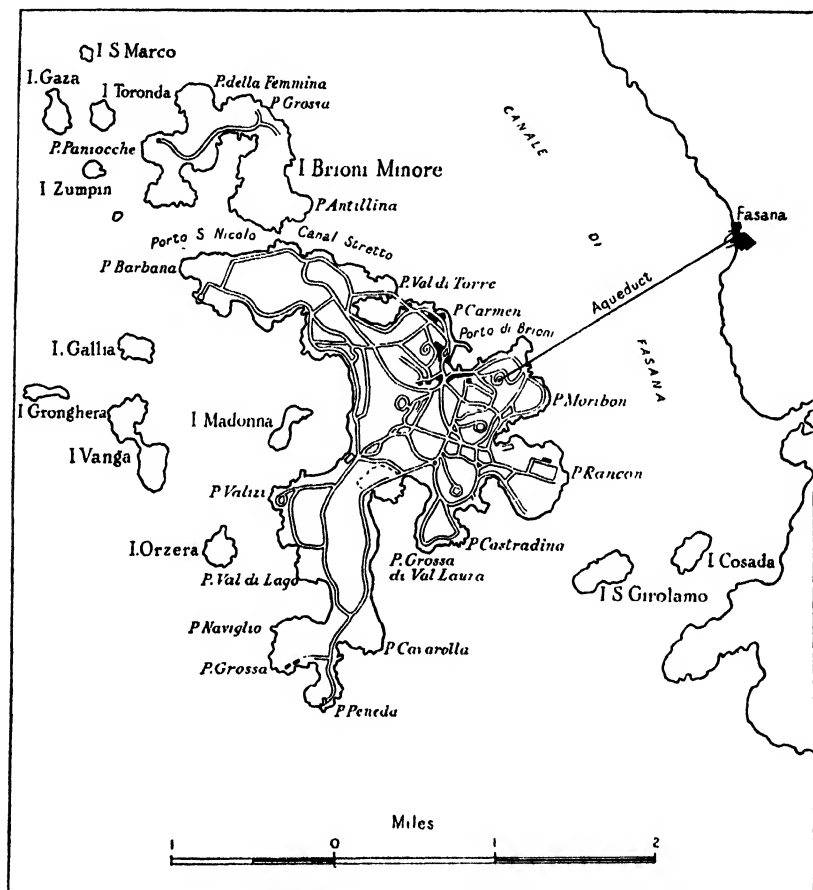


FIG. 76. *Brioni Islands*

telephone service and is visited regularly by steamship lines from and to Venice, Fiume, Gravosa, Trieste, and Zara. In addition ferries ply frequently to Porto Fasana and the port of Pola. The daily seaplane service from Trieste to Ancona also called at Brioni Maggiore. The main roads on Brioni Maggiore are motorable.

APPENDIX I

DAMAGE TO CITIES AND WORKS OF ART, 1940-1945

THE following information as to war damage to cities and works of art mentioned in Chapters XXI and XXII is taken from *Works of Art in Italy, Losses and Survivals in the War*, Part I. *South of Bologna* (London, H.M. Stationery Office, 1945). Part II was not published at the time of writing.

AGRIGENTO. The ruins of the temples are unharmed in spite of the fact that they were organized by the Italians for defence. The frescoes in the cathedral were damaged by blast and the museum suffered, but its contents escaped with slight damage.

ANCONA. The city was stubbornly fought over and suffered major damage from bombing and shelling. The cathedral lost its roof, and part of the wall of the south transept collapsed and fell into the crypt. The museum sustained several direct hits, but the pictures had been removed and half the archaeological collections stored in the cellars. Sta. Maria della Piazza suffered only slight damage, but the neighbouring church of Sta. Maria della Misericordia was completely destroyed and the Loggia dei Mercanti is a wreck. Trajan's Arch and the eighteenth-century arch known as the Arco Clementino escaped damage.

AQUILA is undamaged.

AREZZO. A bomb struck the Museo Civico and a number of pictures which the authorities had neglected to remove were destroyed, also a collection of ceramics. Damage to the protecting roof caused a few stains on the Piero della Francesca frescoes in S. Francesco, but the churches are for the most part unhurt.

ASCOLI PICENO. The city is undamaged except for three bridges destroyed by the Germans.

ASSISI is undamaged, and the pictures, stained glass, &c., stored in vaults below the Franciscan Convent are safe.

BARI. Blast caused some damage to the cathedral and to the roof of S. Nicola. Works of art were removed to safety.

BENEVENTO. The cathedral was almost completely destroyed and is one of the most serious losses sustained. The campanile still stands, and some of the plaques from the bronze doors were salvaged.

BRINDISI. The campanile was damaged, and minor repairs were necessary in the cathedral. The Roman column is intact, and art treasures from churches and museums were removed to safety.

CALTANISSETTA. Holes were made in the roof of the cathedral endangering the frescoes on the ceiling. Other damage is superficial.

CAMPOBASSO. All the collections in the Museo Sannitico are intact, except the coins.

CATANIA. Several churches were badly damaged. S. Nicolo suffered very little and the crown of Sta. Agata is safe. Some pictures were looted, but the books from the University Library had been removed. Damage to Castello Ursino has been repaired.

CHIETI is undamaged.

CIVITAVECCHIA. Serious damage has been done to Julius II's fortress and also to the museum.

COSENZA. The cathedral and S. Francesco suffered roof damage which has been repaired. The Museo Civico is intact, but a considerable number of books in the library were destroyed.

CROTONE. The single column of the temple of Hera at Cape Colonna is intact.

ENNA. A bomb-hole in the roof of the cathedral has been repaired to protect the fine wooden ceiling.

FLORENCE. A booklet issued to the Allied Forces warned them that 'The whole city of Florence must rank as a work of art of the first importance.' Thanks to the care taken, no damage of any significance is attributable to Allied action. The great monuments escaped practically without injury, and even Sta. Maria Novella, close to the much bombed railway yards, was not hit. All the more important pictures from the various galleries were removed to deposits outside the city. The Germans blew up all the bridges except the Ponte Vecchio, and, according to a plan made long in advance, systematically destroyed the approaches to this famous bridge. As a result, the heart of the old city on the north bank of the Arno has gone, and the Uffizzi Palace suffered much damage from blast. South of the river there is widespread devastation along the Lung' Arno on either side of the bridge; many old houses have perished, and the famous view, with medieval houses reflected in the water, is lost for ever.

FOGGIA. The cathedral with its baroque paintings suffered some injury.

FORLI. Such harm as was done was mostly due to German mining of buildings and shelling of the city after the Allied occupation. The cathedral is virtually intact and the movable treasures have been stored in safety. A direct hit on S. Biagio destroyed the church with its frescoes by Melozzo da Forli. The palace housing the Pinacoteca was hit, but the pictures had been removed and are safe except for four stolen by the Germans.

GAETA. The cathedral suffered considerable damage, but its fifty-seven Roman columns survive, as does the campanile. Its treasures were stolen by the Germans, who tore the vestments from their presses and carried off the best.

GROSSETO. The cloisters of the cathedral were razed, but the main building is undamaged.

LECCE. The city does not appear to have suffered damage.

LEGHORN (Livorno). The city suffered heavily from bombing and the

cathedral was wrecked beyond repair. Tacca's bronze Moors were removed to a place of safety.

LUCCA. The city escaped very lightly, and only slight damage was done to the cathedral and two other buildings.

MACERATA. The city is undamaged and its works of art intact.

MANFREDONIA. The castello is damaged, but is still in fair repair.

MARSALA. The Flemish tapestries in the cathedral are safe.

MESSINA. The city was a constant target for our bombers and suffered heavily. The cathedral was badly damaged and the mosaics of the apse have perished. The fountain in the Piazza had been sandbagged and is intact. Sta. Annunziata was damaged by blast. Important works of art and books from the University Library were removed to places of safety.

NAPLES. Numberless buildings were wrecked through allied bombing of the harbour and the railway and German demolitions. No less than six churches were destroyed and nineteen seriously damaged. Among the latter are Sta. Chiara, which only escaped being a total loss, and Monte Oliveto, which was wrecked by a German bomb. In both the work of salvage is proceeding. The cathedral suffered damage from a bomb which entered the clerestory, but the Chapel of St. Januarius is safe. The contents of the Museo Nazionale were packed and stored at various places; of the eighty-seven cases sent to Monte Cassino, six are missing, among them being bronzes from Herculaneum and Pompeii. The Castel Nuovo escaped damage, and the triumphal arch of Alfonso I was well boarded up. The Palazzo Reale suffered some damage, and the books of the University Library, together with the priceless Angevin archives, were deliberately burnt by the Germans.

ORVIETO. A single bomb destroyed one house, otherwise the city, including the cathedral, is intact.

PALERMO. The city has suffered damage, but the Norman buildings are, almost without exception, intact. A fire broke out in the Palazzo Reale when it was serving as the H.Q. of the U.S. Army, destroying a series of rooms and seriously endangering the roof of the Cappella Palatina. The Museo Nazionale was badly damaged and the National Library destroyed, but the contents of both had been removed to safety. Among the badly damaged churches is S. Giuseppe dei Teatini. The abbey of Monreale has survived intact.

PERUGIA. The city escaped damage, but the Germans blew up the thirteenth-century Ponte S. Giovanni in the plain below. The contents of the Pinacoteca Vannucci were deposited in a place of safety.

PESARO. The city suffered much from allied bombing and from mining and systematic vandalism on the part of the Germans. The Palazzo Ducale is intact and the Palazzo Mosca practically unharmed; most of the pictures had been removed. The cathedral suffered damage from blast, S. Francesco received a direct hit, but the portals here and at

S. Domenico are safe. At Villa Imperiale the façade was hit and considerable damage was done to the frescoes.

PISA. The city suffered severely. The area south of the river is a scene of utter devastation, and on the north side the buildings along the river front are in ruins. The cathedral, the leaning tower, and the baptistery were only slightly damaged, but the injury to the Campo Santo is a major artistic disaster; the cloister roof was destroyed by a fire which ruined many of the famous frescoes beyond hope of restoration.

PISTOIA. The cathedral was little damaged, but the baptistery was destroyed. S. Domenico was badly bombed and the destruction of the west end involved serious damage to the frescoes. S. Giovanni Fuorcivitas lost its roof, but the pulpit is safe. The Palazzo del Comune and the Pretorio suffered minor damage. S. Andrea, S. Francesco, and the Ospedale del Ceppo are intact.

RAVENNA. The city was hotly contested through weeks of warfare and suffered from bombing and shelling, but the total damage to important monuments is remarkably light. S. Apollinare Nuovo suffered over a dozen bomb hits within 75 yards of the building. Damage was done to the roof, but the mosaics are unharmed. S. Apollinare in Classe has ten shell-holes in the roof, but the mosaics were only slightly damaged. S. Vitale, the mausoleum of Galla Placidia, the Palazzo Arcivescovile, and the tomb of Dante escaped, as did the baptistery of the Orthodox, save for minor injuries.

REGGIO DI CALABRIA. The cathedral was struck by incendiary bombs and its interior partly burned out. The contents of the museum were safely stored.

RIETI is undamaged.

RIMINI was a key point in the German defence line and the damage to its monuments was very severe. The Malatesta temple, the most famous building in the city, is amongst the most seriously damaged, but is capable of being restored. The roof is gone, the façade cracked, and the easternmost chapels destroyed, but Duccio's reliefs of the Arts and Sciences and the fresco of Sigismondo Malatesta are safe. The Arch of Augustus was shaken by blast but still stands, and the Roman bridge is intact. The Castello Sigismondo suffered damage to walls and roof.

ROME. S. Lorenzo fuori le Mura, one of the seven pilgrimage churches of Rome, received a direct hit from Allied bombs aimed at the adjoining marshalling yards, and its roof and façade were destroyed. Apart from this, and bomb hits which made two breaches in the Aurelian Wall, the city suffered no damage.

SALERNO. In the fighting round the city the cathedral escaped miraculously. **S. MARINO** is undamaged.

SIENA. The city suffered practically no damage as the plan of the mines which the Germans had planted was found and all were removed before any harm was done.

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SYRACUSE. Refugees sheltering in the catacombs did some damage by cutting away walls and niches in the attempt to improve their quarters.

The museum buildings were damaged, but those antiques which had not been stored suffered only slight injury. Damage to the cathedral was not serious and the temple ruins are intact.

TARANTO. The gold objects from the museum were deposited in a bank at Parma and the treasures of the churches were removed to safety.

TERAMO is undamaged.

TERNI. The cathedral suffered severely and the fourteenth-century frescoes, illustrating the Divine Comedy, in S. Francesco have been damaged.

URBINO. The city had a narrow escape. The Germans mined all the walls, but only the mines at the south-west corner exploded, the rest being removed by British sappers. Damage was thus limited to 200 yards of wall and broken windows. All the monuments, galleries, and archives are unharmed.

APPENDIX II

PETROLEUM FACILITIES

THE following list gives the common name or symbol, the full title, and the address of the head office of the main companies concerned.

AGIP	Azienda Generale Italiana Petroli	Rome
ANIC	Azienda Nazionale Idrogenazione Combustibili	Milan
APIR	Azienda Petroli Italo Rumena	Rome
Aquila	'Aquila' S. A. Tecnico Industriale	Trieste
BP	Benzina Petrolio S. A. Italiana per l'Industria ed il Comercio Degli Olii Minerali	Trieste
CGOM	Compagnia Generali Olii Minerali	Genoa
Damiani	S. A. Damiani e Giorgio	Venice
DICSA	Distillazione Italiana Combustibili S. A.	Venice
INEA	Imprese Navali ed Affini	Venice
INPET	Soc. per l'Industria Italiana del Petrolio	Genoa
Nafta	'Nafta' Societa Italiana del Petrolio ed Affini	Genoa
Petrolea	S. A. Italiana 'Petrolea'	Rome
ROMSA	Raffineria di Olii Minerali S. A.	Fiume
SAPP	S. A. Prodotti Petroliferi	Genoa
SIAP	Soc. Italo-Americana pel Petrolio	Genoa
SIO	S. A. Italiana Importazione Olii	Genoa
SPI*	Soc. Petrolifera Italiana	Fornovo di Taro
UIL	Unione Importatori Lubrificanti	Genoa

* Not to be confused with the Societa Petroli d'Italia of Milan.

Note: — = no facilities.

.. = details unknown.

I. REFINERIES

Major Plants

(For Storage Capacity see under Ocean Terminals, &c.)

Place	Name	Refinery capacity (Metric tons per year, Barrels per day)	Remarks
Fiume	ROMSA	120,000 T/Y 2,500 B/D	<i>Site.</i> On shore, c. 1,000 yds. W. of Porto Principale. <i>Plant.</i> Somewhat obsolete. <i>Facilities.</i> Pipe and shell stills. Crack- ing plant (obs.). Lube agitators.
Trieste	Aquila	350,000 T/Y 7,300 B/D	<i>Site.</i> On SE. shore of Zaule bay, Muggia bay. <i>Plant.</i> Modern. <i>Facilities.</i> Pipe still. Lube plant. <i>Main production.</i> Residual fuel oil, 39%. Gasoline, 18%.

<i>Places</i>	<i>Name</i>	<i>Refinery capacity (Metric tons per year, Barrels per day)</i>	<i>Remarks</i>
Trieste	SIAP	150,000 T/Y 3,100 B/D	<i>Site.</i> On N. shore of Zaule bay, Muggia bay. <i>Plant.</i> Old fashioned. <i>Facilities.</i> Shell stills. Lube agitators. <i>Main production.</i> Kerosine, gas, and diesel oil, 27%. Lube, 20%.
Venice, Porto Marghera	AGIP (DICSA)	450,000 T/Y 9,400 B/D	<i>Site.</i> Near NW. end of Canale Vittorio Emanuele III. <i>Plant.</i> Modern. <i>Facilities.</i> Pipe stills. Cracking unit.
Fiorenzuola d'Arda	AGIP	10,000 T/Y 200 B/D	<i>Plant.</i> Old and very small. <i>Facilities.</i> Shell stills. <i>Main production.</i> Gasoline, 70%. Kerosine, gas, and diesel oil, 25%. Uses local products only.
Fornovo di Taro	SPI	50,000 T/Y 1,100 B/D	<i>Plant.</i> Old and very small. <i>Facilities.</i> Shell stills. Agitators. <i>Main production.</i> Gasoline, 70%. Kerosine, gas, and diesel oil, 25%. Uses local products only.
La Spezia	INPET and Nafta	350,000 T/Y 7,300 B/D	<i>Site.</i> Inland, $\frac{1}{2}$ mile N. of Porto Mercantile. <i>Facilities.</i> Pipe stills. Cracking coils. Asphalt plant. <i>Plant.</i> Old, expanded, and modernized. <i>Main production.</i> Residual fuel oil, 38%. Gasoline, 25%.
Leghorn	ANIC	250,000 T/Y 5,200 B/D	<i>Site.</i> Inland, 3 miles NE. of harbour. <i>Plant.</i> Modern and complete. <i>Facilities.</i> Pipe stills. Cracking coils. Lube plant. Hydrogenation unit. Destroyed and put out of action in 1943.
Naples*	Raffineria di Napoli	200,000 T/Y 4,200 B/D	<i>Site.</i> Inland, 2 miles NE. of harbour. <i>Plant.</i> Modern. <i>Facilities.</i> Pipe still. Cracking coils. Lube plants. Asphalt plant. <i>Main production.</i> Kerosine, gas, and diesel oil, 36%. Gasoline, 33%.
Bari	ANIC	250,000 T/Y 5,200 B/D	<i>Site.</i> Inland, c. $1\frac{1}{2}$ miles SW. of harbour. <i>Plant.</i> Modern. <i>Facilities.</i> Pipe still. Cracking units. Lube plant. Hydrogenation unit. Asphalt plant. Gas plant. <i>Main production.</i> Residual oil, 50%. Gasoline, 15%. Handles mainly Albanian crude.

* The BENIT refinery near by has been closed down for some time.

Minor Plants

Milan	A crude oil still. Obsolete and shut down, possibly even dismantled. 2 lube and white oil blending plants, 1 with naphtha rectifying column.
Rivarolo	1 lube and white oil blending plant.
Genoa	1 asphalt still.
Vado Ligure	1 lube and white oil blending plant. Sited at AGIP storage. About 9,000 tons of oil treated during 1935.
Rome	A crude oil still. Obsolete and shut down.
Ragusa	A crude oil plant. 1½ miles south of railway station.

2. OCEAN TERMINALS

A. Northern Adriatic Sea

Port	Owner or company	Capacity (m. ³)		No. of tanks	Site and remarks
		White	Black		
Fiume	ROMSA (AGIP)	65,077		60	At ROMSA refinery, immediately N. of Porto del Petrolio.
Pola	Navy	52,000		12	At head of Valle Zonchi, on north side of harbour. Naval fueling plant only.
Trieste	Aquila	22,028	63,290	47	At SE. of Zaula bay, Muggia bay, with refinery. Pipe-lines to oil berths.
	SIAP	15,165	42,194	44	All in or near SIAP refinery on north shore of Zaula bay, Muggia bay. Warehouses in SIAP area. Pipe-lines to oil berths.
	BP	28,100		10	
	Shell	6,700	6,700	4	
	Floridsdorfer				
Venice	Nafta	—	21,000	4	N. end of Malamocco island (I. di Lido). Bunkering plant. Near Porto di Malamocco, at west corner of F. Alberoni. East end of La Giudecca. Bunkering plant. Known as Venice Main Island store: on Banchina di Palazzo at north end of Bacino di Stazione Marittima.
	Gardella	7,300	1,500	6	
	Navy	—	3,500	3	
	AGIP	2,000		2	
	SIO	—	8,000	2	
	State Railways	2,000	2,000	4	

PETROLEUM FACILITIES

Port	Owner or company	Capacity (m. ³)		No. of tanks	Site and remarks
		White	Black		
Venice, Porto Marghera	SIAP	31,995	15,650	22	Immediately N. of Porticiolo dei Petroli, north-west end, north-east side of Canale Vittorio Emanuele III.
	Nafta	22,260	37,400	21	Just W. of SIAP store. 5 large warehouses.
	DICSA (AGIP)	5,650 (10,850 unknown)	23,150	18	Just W. of Nafta plant. Possibly a pipe-line to Porticiolo dei Petroli.
	AGIP	53,400	132,000	36	East side of Canale Brentella, W. and NW. of DICSA refinery. Storage for cased goods also.
	INEA (? AGIP)	9,400	—	16	N. of AGIP plant.
	Damiani (? AGIP)	9,600	—	4	North end of Canale Brentella, east side. Warehouses.
	APIR (? AGIP)	17,100	—	9	North end of Canale Brentella, west side. Pipe-line to DICSA refinery. Several warehouses.
	Tagliabue	—	28,500	20	East bank of Canale Industriale Ovest.
	Societa Adriatica di Elettrocita Rana (AGIP)	—	10,000	2	Bunkering plant. West bank of Canale Industriale Ovest. Plant storage.
		25,000	—	12	3,200 yds. SW. of Mestre railway station. Underground fuel oil store.
Marina di Ravenna (Porto Corsini)	Nafta	5,070	385	13	At junction of Naviglio Candiano and L. Baiona. Also considerable storage for cased goods.
	Aquila	5,953	—	1	On north-west bank of Naviglio Candiano, ? $\frac{1}{4}$ mile SW. of Nafta store.
Ancona	Government	—	1,000	2	At root of causeway leading to Molo Sud.
	Government	—	13,000	8	Bunkering plant. East of harbour. Underground. Bunkering plant.

B. Ligurian Sea

Port	Owner or company	Capacity (m. ³)		No. of tanks	Site and remarks
		White	Black		
Vado Ligure	AGIP	15,000	27,000	..	Inland, c. 1,000 yds. SW. of mouth of T. Segno. Small white oil refinery at south-west corner. Pipe-line to AGIP oil-pier.
	SAPP	—	10,122	26+	Inland, south-east bank of T. Segno, E. of railway bridge. Mainly lube oils. Ample storage for cased goods. Pipe-line to SIAP oil-pier.
	SIAP	41,395	8,869	33	Inland, 700 yds. WSW. of mouth of T. Segno, north bank. Adequate storage for cased goods. Can manufacturing facilities. Pipe-line to SIAP oil-pier.
	Nafta	22,660	23,650	14	Inland, on south bank of T. Quiliano, 1,100 yds. from mouth. Pipe-line to Nafta oil-pier.
	Petrolea	19,120	32,248	18+	Inland, $\frac{1}{2}$ mile W. of mouth of T. Letimbro, N. of railway line. Pipe-line to oil-pier at mouth of R. San Cristoforo.
Savona	SIAP	—	14,426	8	At root of Molo Luigi Razza. One warehouse. Pipe-line to oil-berths on Molo Frangiflutti.
Genoa	CGOM	—	42,900	16	On Calata Olli Minerali.
	UIL	—	20,600	12	On Calata Olli Minerali.
	SIO	—	11,500	..	On Ponte Paleocapa.
	State Railways	? 8,300		3	At root of Molo Nuovo.
	..	..	..	..	Underground, at root of Molo Costanzo Ciano. Large.
La Spezia	INPET	14,000	83,000	43	Inland, at refinery. Pipe-line to Molo Duca degli Abruzzi in Porto Mercantile.
	Nafta	16,800	8,300	12	At INPET refinery. Pipe-line as above.
	AGIP	21,850	5,000	6	At INPET refinery. Pipe-line as above.
	Navy	? 74,070		..	Three groups of tanks: near root of Molo di Varicella; NW. of Vasche di S. Vito (underground); and S. of Dock No. 5 in the Seconda Darsena.

Port	Owner or company	Capacity (m. ³)		No. of tanks	Site and remarks
		White	Black		
La Spezia— <i>contd.</i>	State Railways	? 1,500		3	At root of Molo Duca degli Abruzzi. Lube store.
Leghorn*	SIAP	30,845	9,994	24	West side of Bacino d'Evoluzione at root of Diga Marzocco. Storage for cased goods. Pipe-line to Darsena dei Petroli.
	Nafta	—	8,961	2	E. of Maritime station. Bunkering plant.
	ANIC (AGIP)	126,000		..	At refinery. Pipe-lines from Darsena Ugione.
Civitavecchia	Nafta	—	4,500	3	? Location.
	Government	—	4,500	1	On outer mole at north-west end of Banchina Traiana. Bunkering station.

* Warehouses of State Railways and Government to W. of Canale delle Industrie. A buried supply (? APIR) is reported 1,000 yds. N. of Torre del Marzocco.

C. Southern Italy

Port	Owner or company	Capacity (m. ³)		No. of tanks	Site and remarks
		White	Black		
Pozzuoli	Navy	? 58,000		8	Buried, NW. of railway station.
		37,000+		4	Buried, E. of cemetery and 1,000 yds. NW. of above. Pipe-line from both to piers.
Naples	SIAP	80,000	100,000	36+	Inland, at refinery.
		11,000	16,000	25	Immediately W. of refinery. Shipment depot.
		58,000		10+	Inland, at the old BENIT plant, on north-west bank of Canale Navigabile, $\frac{1}{4}$ mile NE. of Pontile Vigliena.
	..	..	..	7	All the above are connected by pipe-line to Pontile Vigliena.
					Inland, SW. of south end of Via dello Sperone.
					Inland, immediately NE. of BENIT plant. Pipe-line to Pontile Vigliena.
	AGIP	17,000	17,500	18	Inland, $\frac{1}{4}$ mile N. of Pontile Vigliena, to which a pipe-line leads.

Port	Owner or company	Capacity (m. ³)		No. of tanks	Site and remarks
		White	Black		
Naples— <i>contd.</i>	SIO	3,100	3,000	4	Immediately NE. of Pontile Vigliena, to which a pipe-line leads.
	..	—	4,000	2	On foreshore E. of Pontile Vigliena at Maurizio Vigliena thermal generating station.
	..	—	500	1	Inland, SE. of AGIP store, at Doganella thermal generating station.
Taranto	Navy	31,887		15	180 yds. S. of root of Old Coaling Quay mole. Pipe-line to Arsenal quay.
		37,960		8	300 yds. N. of Point Penna.
		26,098		7	1,500 yds. NNE. of Point Penna. Pipe-lines to T-jetty at root of le Fronte jetty.
		..	..	5	There are at least 6 other groups of tanks SE. of town near new harbour works; capacity unknown; many connected by pipe-line to the Y-shaped jetty on SE. of Mare Grande. Total capacity of port may be as much as 285,000 cu.metres.
Brindisi (<i>see also under 'Miscellaneous'</i>)	Navy	25,623		15	Extreme SW. of Seno di Levante. Two fuelling piers for destroyers.
Monopoli	SIAP	18,000		14	At root of Molo Nord; pipe-line to two-oiling jetties on outer leg of same.
Bari	ANIC	262,770		62	Inland, at refinery. Pipe-line to Molo Luigi Razza.

Miscellaneous

Barletta	4 tanks, total capacity c. 1,330 cu.m., on harbour front, half-way between moles and breakwater.
Brindisi	<p>a. Underground for aviation petrol behind seaplane hangars on west shore of Porto Esterno.</p> <p>b. Underground tank between commercial seaplane hangars, north of air force hangars.</p> <p>c. Tanks with capacity of c. 5,000 cu.m. for special oil for submarines. Location not known.</p> <p>d. 4 tanks immediately west of Castello within castle walls.</p>
Castellammare di Stabia	Tanks at base of breakwater separating naval from commercial harbour; total capacity reported as c. 4,300 cu.m.

Gaeta

Naval depot. 4 or 5 buried tanks NW. of town; 2 or 3 buried tanks (? for crude, ? capacity 50,000 cu.m.) SE. of railway station; 3 tanks 250 yds. W. of Point San Antonio. Total capacity possibly 82,000 cu.m.

Molfetta

Normally 16 cu.m. in drums. Two pumps on Banchina San Domenico accessible to craft drawing less than 11 ft.

Reggio di Calabria

Three tanks on northern outskirts, c. 1,100 yds. NE. of train ferry terminal. Capacity, ? 23,650 cu.m.

D. Sicily

Port	Owner or company	Capacity (m. ³)	No. of tanks	Site and remarks
Augusta	Nafta	17,400	8	Immediately S. of railway station. Pipe-line to Nafta oiling jetty.
	Navy	? 237,250	25	Underground, behind Punta del Cugno.
	"	? 20,000	5	S. of Nafta tanks.
	"	..	3	On Isolotto di Augusta, SW. of Citadel and E. of Banchina Militare.
Messina	SIAP	3,650	3	Immediately SW. of Punta S. Raineri.
	"	12,300	8	Close S. of east end of Banchina Luigi Rizzo. Supply for train ferries.
	"	..	3	S. of train-ferry berths.
	Navy	..	?	Buried, immediately N. of dry-dock.
Palermo	Nafta	6,500	2	On Banchina Quattroventi.
	? Navy	? 113,900	10-12	Inland, buried 400 yds. NE. of La Favorita park at foot of Monte Pellegrino. Pipe-line to Banchina Quattroventi.
	?	? 1,000	6	At S. Lorenzo, 2½ miles NW. of harbour.

Miscellaneous

Catania

- (i) 3 tanks, near root of Molo di Levante.
 (ii) 4 buried tanks, 600 yds. SW. of cemetery.
 (iii) 10 buried tanks (Nafta), 400 yds. S. of Acquicella station.

} Capacity
unknown

Trapani

- (i) 4 tanks for fuel oil, 1 tank for motor spirit, 1,100 yds. ESE. of railway station, in Saline del Collegio.
 (ii) 3 large buried tanks, 2,500 yds. E. of (i)
 (iii) 3 large buried tanks, 600 yds. E. of (ii).
 (iv) 2 large square buried tanks, 600 yds. E. of (iii) with pipe-line to Trapani/Milo airfield.
 Total storage, ? 57,000 cu.m.

E. Sardinia

Port	Owner or company	Capacity (m. ³)	No. of tanks	Site and remarks
Cagliari	Navy	c. 18,980	6	Buried, in a quarry E. of cemetery. Pipe - line to harbour.
	"	c. 36,000	4	On northern and north-eastern slopes of hill 1,300 yds. NE. of above.
	Army	..	—	Buried.
	Shell	c. 1,900	..	Huts for packed oils immediately S. of Monserrato airfield.
	Lampo	c. 2,800	3	Buried, 330 yds. WSW. of Scaffa bridge, on north side of road.
La Maddalena	Nafta	c. 19,000	9	1,100 yds. SW. of Army supply.
Porto Torres	{ SIAP } { Nafta }	132 + 132	..	North-east corner of Isola S. Stefano, on cliff top.
				In underground depôt on north side of Via Mare. Equal amounts of kerosine and motor spirit.

3. INLAND STORAGE

A. Northern Italy

(North of a line between La Spezia and Marina di Ravenna)

There are 164 bulk storage points located in 61 towns. The three principal operators are AGIP, Nafta, and SIAP. Most plants are near the railway, and, with few exceptions, tanks are small and underground. In some of the smaller places the plant and tanks are the property of local agents for the bigger firms.

Place	Capacity (m. ³)		No. of tanks	Warehouse capacity (metric tons)	Remarks
	White	Black			
Abbiategrosso	66	22	4	14	..
Alba	67	—	3	23	..
Alessandria	516	225	10+	90	..
Aosta	260	44	10	—	..
Asti	310	96	16	22	..
Bassano	103	—	4	110	..
Belluno	331	62	9+	21	..
Bergamo	692	633	14+	110	..
Biella	417	192	11+	46	..
Bologna	1,108	666	16	180	..
Bolzano	313	74	10+	—	..
Brescia	807	252	25+	—	..
Brunico	75	—	2	—	..

Place	Capacity (m. ³)		No. of tanks	Warehouse capacity (metric tons)	Remarks
	White	Black			
Busto Arsizio	474	1,024	13	170	..
Casale Monferrato	95	—	..	—	..
Casalmaggiore	91	—	2	—	..
Cerea	80	—	4	21	..
Chiavenna	47	—	2	11	..
Civate Camino	50	—	2	—	..
Como	570	286	11+	115	..
Copparo	94	—	4	22	..
Crema	94	—	4	—	..
Cremona	477	262	14+	34	..
Cuneo	272	44	7+	45	..
Domodossola	79	25	3+	20	..
Ferrara	514	256	13+	65	..
Fidenza	396	74	15	55	..
Fiorenzuola d'Arda	5,570	—	..	—	..
Fornovo di Taro	1,360	880	20	—	An unknown amount of underground storage in hills near by.
Genoa	3,529	—	..	—	Not including port.
Gorizia	537	169	9+	50	..
Lodi	466	—	11	86	..
Mantua	674	178	6+	100	..
Milan	3,178	2,567	46	1,250	Additional storage up to 150,000 m. ³ at 4 other groups; no details.
Mirandola	76	—	3	35	..
Modena	396	296	16+	45	..
Montagnana	66	—	3	28	..
Montebelluna	40	—	2	—	..
Monza	432	324	13+	140	..
Novara	550	298	24	166	..
Oderzo	65	—	3	—	..
Padua	434	156	19+	145	..
Parma	605	197	28+	135	..
Pavia	344	44	13+	—	..
Piacenza	407	165	12+	95	..
Pinerolo	124	—	5	31	..
Pordenone	196	—	7	25	..
Porto Maggiore	88	—	3	50	..
Reggio nell' Emilia	511	129	19	115	..
Rovigo	257	129	4+	60	..
Santa Dona di Piave	163	44	9	32	..
San Giorgio di Nogara	6,760	—	..	—	Mostly black oils.
Sondrio	117	22	2	—	..
Trento	334	—	8+	85	..
Treviso	305	122	14	100	..
Turin	2,472	1,938	36+	850	Excluding consider- able tankage (dam- aged) at Fiat factory.
Udine	463	84	12+	60	..
Varese	528	130	13+	75	..
Verona	456	162	18+	150	..
Vicenza	318	347	14+	75	..
Voghera	148	96	10	60	..

B. Central Italy

(South of 'A' to a line between Rome and Chieti)

There are 74 bulk storage plants located in 29 towns. General conditions conform to those already stated for Northern Italy.

Place	Capacity (m. ³)		No. of tanks	Warehouse capacity (metric tons)	Remarks
	White	Black			
Aquila	169	—	6	—	..
Arezzo	250	104	17	—	..
Ascoli Piceno	66	—	..	—	..
Bagni della Porretta	107	—	4	—	..
Chieti	29	—	2	—	..
Fabriano	23	—	1	—	..
Faenza	89	22	5	28	..
Falconara	466	258	18+	110	..
Fiumicino	1,240	—	8+	—	Mostly government stock.
Florence	1,156	306	34+	240	..
Foligno	96	—	3	30	..
Forli	542	144	13+	46	..
Grosseto	264	22	11	40	..
Grottomare	43	—	2	—	..
Imola	40	—	2	—	..
La Spezia	40	—	..	—	Not included in Ocean terminals.
Lucca	475	32	8+	55	..
Macerata	265	421	14	50	..
Perugia	385	156	12+	—	..
Pesaro	279	74	15	50	..
Pescara	258	152	10+	—	..
Pistoia	318	—	4+	70	Additional 132 m. ³ unspecified.
Ravenna	267	148	8+	—	..
Rimini	312	44	4+	—	..
Rome	5,523	991	25+	1,120	..
Siena	66	44	5+	—	..
Teramo	62	—	3+	—	..
Terni	184	76	7+	55	..
Viterbo	132	88	8+	—	..

C. Southern Italy

There is little information available for Italy south of the Rome-Chieti line. SIAP is reported to have bulk storage of about 50 cu.m. in each of the following towns:

Altamura, Avellino, Benevento, Foggia, Frosinone, Potenza, Salerno.

No details are known of the storage of any other companies.

APPENDIX III

PRINCIPAL RIVERS OF SARDINIA

THOSE rivers with 'o' for their minimum discharge are dry at low water, but at such times a river bed, though consisting mainly of spreads of dry shingle, may also have pools of water here and there. Figures of discharge have been converted from cubic metres per second; this accounts for the frequent occurrence of 35, 71, &c. (1 and 2 cu. m.).

River	Approx. length, miles	Approx. catchment area, sq. miles	Place	Discharge, cu. ft. per sec.		
				Min.	Max.	Mean
Sa Picocca . .	24	—	Near mouth	o	1,660	35
Flumendosa . .	113	688	Near source	o	6,200	71
" . .	—	—	Villanuova Tulo	o	19,300	282
" . .	—	—	Armungia	o	27,900	530
Cedrino . .	42	—	Dorgali	o	20,300	247
Liscia . .	36	—	Near mouth	o	8,650	176
Coghinas . .	65	956	Chilivani	o	3,350	71
" . .	—	—	Ozieri	o	2,750	35
" . .	—	—	L. Coghinas	o	8,150	176
" . .	—	—	Tributary from M. Lerno	o	4,870	106
Mannu di Porto Torres	38	—	Sassari	o	1,835	35
Temo . .	35	—	Pozzomaggiore	o	4,270	71
Tirso . .	93	1,303	—	—	—	—
Taloro . .	32	—	Gavoi	o	3,560	141
Flumineddu . .	26	—	Allai	o	14,160	212
Araxisi . .	22	—	Meana Sardo	o	1,907	71
Mannu . .	14	—	Fluminimaggiore	o	917	35
Palmas . .	25	—	Palmas	o	2,320	71
Flumini Mannu or di Samassi (in- cluding Cixerri)	47	884	Isili	o	953	35

APPENDIX IV MAIN ROADS OF SARDINIA

Road No. or Class	Terminals	Highest Points	Height (feet)	Gradients > 1 : 14	Principal Defiles	Remarks
125	CAGLIARI-TERRANOVA PAUSANIA (OLBIA)	(1) Near M. Sette Fratis (2) Turning for Ierzu (3) Near M. su Nercone	1,417 892 3,314	At S. Basilio. Ascent to summit before turning for Burcei. 2 miles past turning for Burcei. After turning for Ierzu.	From junction on R. de Su Perdosu to bridge over T. Sa Picocca. For 1½ miles after turning for Ierzu. In stretch from Baunei to Dorgali road frequently on lower slopes of precipices, e.g. at Punta s'Abbadorgiu and at M. su Nercone.	Ridge road from Baunei to Dorgali (with some devia- tions).
126	TERRALBA (road 131)- PORTO BOTTE	(1) Near Miniera di Gennamare (2) S. Angelo	1,476 2,000	Two hairpin bends halfway between Guspini and Arbus. After turning for Miniera di Gennamare. Three (short) on descent to R. Bega. Descent to R. Canonica north of Iglesias.	—	Continued by main road to Cagliari along S. coast.
Main	S. GIOVANNI SUERGIU (road 126)-CALASETTA	—	—	—	Passes over sandbar and bridges to S. Antioco island.	—
Main	PORTO BOTTE-CAGLIARI	3½ miles past Teulada	1,000	Ascent to summit. Descent to Sarroch.	Sand-bar between sea and salt pans from La Madda- lena to Cagliari (with 10 bridges over outlets).	—

MAIN ROADS OF SARDINIA

Road No. or Class	Terminals	Highest Points	Height (feet)	Gradients > 1 : 14	Principal Defiles	Remarks
127	TERRANOVA PAURANIA- SASSARI	(1) Near Can- toniera l'Arsi (about 4 miles east of Calangianus)	1,952	Two (abort) on descent to F. Coghinas. Crossing valley of R. Silanis after Perfugas. Ascent towards Martis.	—	—
127-bis	PORTO CONTE (AL- GHERO)-SASSARI	(2) Osilo Sassari	1,831 738	Colla S. Elmo before Suri- gheddu factory. At Molafà station (abort).	—	—
Main	TERRANOVA-OTZIERI	Near Monti station	1,207	2 miles from junction with road 127.	—	Terranova-Telti included in road 127.
Main	TEMPIO PAURANIA (road 127)-OSCHIRI	Sa Variante	2,198	At Cantoniera Gaddau.	Crosses Coghinas reservoir at Ponte Diana.	—
128	MONASTIR-NUORO	(1) Near Serri (2) Cantoniera Ortuabbi	1,906 2,635	—	—	Cantoniera d'Oniferi-Nuoro included in road 129. Ridge road from Mandas to Serri. Hilly and tortuous mountain road.
128-bis	NUORO-MORES (road 131)	(3) Turning for Tonara Near Pattada	2,625 2,605	1 mile past Benetutti station.	Tonara to Tiana. —	Hilly and tortuous mountain road.
Main	SERRI-TORTOLI	(1) Near Seui (2) Cantoniera Sarcerei	2,831 3,163	Descent to R. Pardu after Gairo station (3 hairpin bends). Ascent after Gairo (3 hairpin bends).	Road avoids gorges of Flum- endosa and tributaries by keeping above them.	Hilly and tortuous mountain road.
Main	FONNI-NUORO	Fonni	3,281	Ascent to Fonni. 1½ miles before Mamoiada.	—	Hilly and tortuous mountain road.

Main	NUORO-TERRANOVA	Near Orune	2,845	Descent from Nuoro to Prato station. Past Bitti. Cantoniera sos Vacoas.	—	Monti-Terranova included in road 127. Hilly and tortuous mountain road.
129	OROSI-BOSA	Near Nuoro	1,857	Ascent to Silanus.	—	Macomer-Bosa may be numbered 129-bis.
130	CAGLIARI-IGLESIAS	After Macomer	2,133	—	—	In plain throughout.
131	CAGLIARI-PORTO TORRES	Iglesias	653	Before and after crossing F. Mannu (before Sanluri; short).	—	—
		Campeda plateau	2,162	Near Bonorva, descent to R. Alchennero. At Torralba (short). Three (short) between turning for Borutta and that for Siligo. At Codrongianus. Two on ascent after crossing R. Mascara (4 bends). One after crossing railway at S. Giovanni station.	—	—
131-bis	Near TIESI (road 131)— ALGHERO (road 127-bis)	West of Cantoniera Planu	1,827	At Tiesi. 1 mile past Tiesi. Ascent of 1 mile before Cantoniera Planu.	—	Last part included in road 127-bis.
Main	ORISTANO-ALGHERO	Cuglieri	1,572	Descent to Ponte Mannu near Tresnuraghes.	—	—
		Villanova Monteleone	1,959	Before Villanova Monteleone.	—	—
Main	CUGLIERI-GHILARZA (road 131)	3 miles east of Cuglieri	3,166	From 1 mile east of Santu Lussurgiu for 1 mile. Descent to stream 1 mile farther on.	—	Steep and tortuous where crossing M. Fernu.
132	MANTIS (road 127)— OZIERI (road 128-bis)	Chiaromonti	1,532	Two before Chiaromonti.	—	—

Road No. or Class	Terminals	Highest Points	Height (feet)	Gradients > 1:14	Principal Defiles	Remarks
133	PALAU-Tempio PAGANIA			1 mile past turning for Luogo Santo. 1 mile past S. Antonio (shrine).	—	Palau is the port for La Maddalena.
133-bis	PALAU-S. TERESA GALLURA	Near Cantonieta Sfossato —	c. 1,650 —	Near Buoncammino (short).	—	Leaves road 133 at bridge over R. Lisoi. Hilly alternative connexion via Campavaglio.
134	CASTEL SARDO-LAERRU (road 127)	Sedini	1,198	At Bulzi.	—	Long climb up cliffs from Castel Sarde.

APPENDIX V

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AUTHORSHIP

This volume has been written and prepared at the Oxford sub-centre by:

- C. M. Ady, M.A., D.Litt.
D. F. W. Baden-Powell, B.Sc., M.A.
R. P. Beckinsale, M.A.
C. B. Gibb, B.A.
C. F. W. R. Gullick, B.Litt., M.A.
R. E. Head, B.A.
L. M. Leakey, M.A.
A. F. Martin, M.A.
E. Montgomery, M.A.

Information and photographs have been received from various government departments.

The maps have been prepared by the drawing staff of the Oxford sub-centre under the direction of K. W. Hartland and by the Geographical Section of the General Staff.

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C. = Capo, cape; F. = Fiume, river; I. = Isola-*e*, island-*s*; G. = Golfo, gulf; L. = Lago, lake; M., Mi. = Monte-*i*, mountain-*s*; P. = Punta, point; R. = Rio, stream; S.A. = Societa Anonima, company; T. = Torrente, torrent.

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